Jackie
Did Roberts
notify Hdq?

Yes, copy on the way
to us
D H

NOTES 9/8/64
WITH COMMENTS

Mr. Newby's Copy

OFFICE OF DIRECTOR – MSFC

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
DEP-A	Mr. Newby			

REMARKS

CODE	NAME	DATE
DIR		9/15/64

MSFC - Form 495 (Rev August 1963)

OFFICE OF DIRECTOR – MSFC

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
DEP-A	Mr. Dannon			

REMARKS

CODE	NAME	DATE
DIR		9/15-Ltr

MSFC - Form 495 (Rev August 1963)

NOTES 9-7-64 MAUS

1. MSF PROGRAM OPERATING PLAN (POP) 64-3 - The MSF POP 64-3 has been completed, signed by Dr. Mueller, and was forwarded to Dr. Seamans on August 31. The submission does not include run-out totals for Apollo; it contains FY 65 and FY 66 figures for Apollo. Run-out costs are to be furnished after the Apollo Assessment is completed. The total MSF FY 66 request is approximately $3.152B.

In the area of Program Additions, the Project Proposal Documents and the Advanced Missions Project Approval Documents are being held by Dr. Mueller until completion of the Apollo Assessment and final allocation of FY 65 funds to Program Offices. The latest proposals are as follows:

Saturn IB/Centaur - A formal project proposal has been prepared by MSF with basic content as presented verbally to Dr. Seamans by E. Z. Gray at MSFC August 26. Total development cost is shown as $44M (versus $50.4M MSFC estimate); MSF is requesting distribution as follows: $10.0M in FY 65 (versus $15.9M MSFC requirement), $26.0M in FY 66 and $8.0M in FY 67. Basic MSF intent is to cover the FY 65 start of IB/Centaur development with advanced study dollars.

Apollo Experiments Support - This is a new name by MSF for extended Apollo Missions. A Project Proposal was presented to Dr. Mueller by E. Z. Gray and received his approval. The proposal included development costs only (except for 2 flight MOLABs and Lunar Flight Vehicles) and totalled $751M. Funding requested for FY 66 is $26.1M (which MSF states they have covered with $20M of available MSF funds and or agreement from Space Sciences and Applications to come up with the balance of $6.1M), and FY 66 funding of $110.3M.

The Project Proposal as developed by E. Z. Gray states: "MSFC is responsible for development of the LEM-Truck and its surface experiment payloads, to include lunar roving vehicles (MOLAB); Lunar Flying Vehicles (Hopper) and the scientific instrumentation and equipment for use on the lunar surface."

2. DATA MANAGEMENT - Jack Young is arranging a presentation on Data Management to be given to Dr. Seamans' Management Committee on September 21. Mr. Young has requested:

(1) General Phillips to give Program Director's views, and Minuteman experience.
(2) Chris Andressen to give the Center view.
(3) Don Dunn, MSF, to give Apollo Accomplishments to date.

fw 9/8

NOTES 9/8/64 McCartney

B 9/9

1. REPAIR AND ALTERATIONS PROGRAM: FY-65 Repair and Alterations Programs (R&A) for R&D Operations includes, to date, 34 projects with a total value of $1.72M. The R&A programs have assumed increasing importance during the past several years, as R&D Operations has experienced a steady reduction in the Construction of Facilities from the FY-63 peak of $41M to the FY-65 figure of $12M and the proposed FY-66 program of $7.3M. My Facilities Group is in daily contact with R&D Operations Laboratories to assist in effective management of the R&A resources available to us. ✓

2. FY-65 SATURN PROGRAM FUNDS: Industrial Operations has advised us of the following changes to the R&D Operations' dollar levels for the Saturn Programs: (Dollars given in thousands)

Program	Guidelines, Beginning FY-65	Current Plan	Change
Saturn I	20,600	22,600	+2.0M
Saturn IB	48,500	43,300	-5.2M
Saturn V	166,100	167,400	+1.3M
TOTAL	235,200	233,300	-1.9M

We are presently evaluating the effects of these changes, particularly of the $5.2M Saturn IB reduction. The reduction was caused when the Saturn IB Project Manager had to cover increased costs of about $10M in the IBM and Bendix prime contracts. ✓

3. SOURCE EVALUATION BOARD, SINGLE SUPPORT CONTRACTOR: The P&VE Request for Proposal was issued last week, as scheduled. The remaining RFP (for Research Projects) is to be released this week. The first set of proposals (for TEST) are to be received by September 15, with all others due in by the end of October. ✓

4. OVERTIME MANAGEMENT: R&D Operations' management has requested that all R&D Operations elements thoroughly review their present overtime management systems against existing regulations. To aid Laboratory management in overtime control, R-DIR has established overtime levels. Operating requirements may, of course, cause greater than anticipated use. Laboratory Directors can continue to approve above-ceiling overtime usage for short periods of time. However, if trends are identified which will place overtime usage for the fiscal year above the approved level, the Laboratory will so advise R-DIR, so that appropriate evaluation and adjustment may be made within R&D Operations' resources. ✓

fwg 9/8

B 9/14

NOTES 9/8/64 RUDOLPH

1. Program Development Plan - A draft Apollo Development Plan has been received from General Phillips for review and comments by September 11, 1964.

We are required to submit a revised Saturn V Program Development Plan by October 15, 1964.

2. Saturn V Systems Engineering and Integration Support - A revised Boeing proposal on Systems Engineering and Integration Support is scheduled for submittal to MSFC on September 9-10, 1964. The proposal will conform to the revised statement of work resulting from MSFC pre-negotiation meetings. The proposal will be transmitted to MSF elements for a "quick look" evaluation and contract negotiations will begin on September 14, 1964.

A.R. I'd like to see it B

3. Saturn V Logistic Support Plan - The MSFC Saturn V Logistic Support Plan has been finalized and will be released for formal review by September 9, 1964. Formal comments will be requested from all action addressees.

I'd like to see it B

4. S-IC Configuration Control - The first S-IC Configuration Control Sub-Board Meeting was held on September 3, 1964. A presentation was made on the Interim Change Procedures in order to familiarize those present with the new system of change control. The Board approved three changes at this first meeting.

5. S-II Common Bulkhead - The Common Bulkhead for the S-II-S is now in the Vertical Assembly Building and preparations are in process for welding cylinder #1 to the bulkhead (J-ring weld to cylinder). Bonding of the Honey-Comb cone to the aft facing plate for the Test Common Bulkhead has been completed.

6. S-IVB Stage:

Quarterly Review - Has been changed to September 29-30, 1964, at MSFC.

Change Control - A meeting has been scheduled with DAC management at MSFC on September 10, 1964, to discuss definitization of change orders.

7. ST-124-M Stabilized Platform Systems - Negotiations with the Bendix Corporation for production of 26 ST-124-M Stabilized Platform Systems were completed September 3, 1964, with a contract price of $39,258,636.00. Incentives are applicable to cost, schedule, and performance.

fw 9/8

B 9/14

NOTES-9-8-64-SHEPHERD

GREEN MOUNTAIN FACILITY: (Reference NOTES-8-24-64-Mc Cartney, copy attached.) At the present time Astrionics Laboratory occupies two tracts of land on Green Mountain under short term lease; one of 60 acres and another of 4 acres. The present lease is for a period of 6 months, expiring November 1964. The Green Mountain property was originally leased from American Machine Foundry Company on May 6, 1961, for a period of three years.

Through the Repairs and Alterations Program, we have added several improvements to the leased property which amounts to $49,000. This consist of a short road, concrete block building and antenna mounts. This facility is used primarily for antenna development and secondarily serves during Saturn flights as a tracking station receiving both telemetry and video data. Recently a need has arisen for use in the Pegasus program.

In January 1964, the Monte Verda Company bought, for residential development, the entire Green Mountain property, including the 64 acres under lease to us.

In May 1964, we were granted authority by Headquarters to extend the present lease until May 1967. However, we have not been able to negotiate a three year lease extension with the present owner. In fact, the Monte Verda Company countered with a written proposal that the Government buy the land for a price of $1,000 per acre, with a buy back option if the Government disposes of the property. Our Legal Office advises that the Government may not enter into an arrangement to buy real property with a seller's repurchase option in the sales contract. Monte Verda's proposal also included an offer to extend the present lease from its expiration date of November 5 until August, 1965.

Due to the timing of the FY-66 budget, it is now necessary for us to pursue two courses of action:

1. Continue negotiations with the Monte Verda Company for:
   a. A sales arrangement in which the legal objection has been removed.
   b. A five year lease arrangement with an option for five additional years. A written proposal is expected from Monte Verda Company on September 8 covering points on both a and b.
2. Submit the necessary project documentation to MSF for funds in the FY-66 CofF Budget to purchase this property.

The decision to either lease or buy this property will be made prior to the release of the FY-66 budget to the BOB on October 1. ✓

Shep

Just make sure they don't run us off that Mountain !!
We need that site. Can't we even resort to condemnation #,
I understand Monte Verda Co. plans to subdivide area
in limesite lots. Will the radio noise still
be acceptable to Astronics after area has been settled?

B 9/14

in case they get stubborn?

1 ATTACHMENT (Dr. von Braun's copy only)

fw 9/8

NOTES 9-8-64 Stuhlinger B 9/14

1. PROJECT PEGASUS: The Pegasus Technical Review Team, of which I am a member, will spend two days (September 8 and 9) at MSFC, one day (September 10) at FSC, and one day (September 11) at GSFC.

2. STATUS OF PROJECT PEGASUS: The NOTES the last two weeks contained several remarks and questions from you in connection with Project Pegasus. A memorandum, answering these questions, is in preparation; it will reach you in a few days.

3. SUPPORT CONTRACT FOR RPL: The RFP for the Support Contract for this Laboratory was discussed and approved last week. The bidders conference will be held September 22.

4. AIAA MEETING ON SPACE POWER AND ELECTRIC PROPULSION: I attended one day of this five-day meeting (copy of my talk was sent to you). Many of the presentations, and even more of the private talks, reflected grave concern about the discrepancy between the large amount of successful research and development accomplished in both areas, and the lack of a sufficient effort on the part of government agencies to proceed now with the development of space power systems in an attempt to match the development status of boosters, and of satellites and space probes. After the "booster gap" has been closed, and the "payload gap" is about to be closed, a very painful "power gap" is looming in our space program. !

5. SRT PROGRAM STATUS: The status of the portion of the ART/SRT program under the cognizance of RPL is, as of September 4, as follows:

	ANNUAL PLAN	AUTHORIZED	PROCESSED TO FMO	OBLIGATED
OART	9,355,000	4,840,000	2,214,000	0
OMSF	13,000,000	0	0	0
OSSA	450,000	30,000	0	0
	22,805,000	4,870,000	2,214,000	0

NOTES 9-8-64 BELOW

F-1 ENGINE

All engines for SA-10 have been returned to MSFC and all engines for SA-8 have been retrofitted with new domes and have completed acceptance testing.

Conversion of the production contract from CPFF to CPIF (Cost Plus Incentive Fee) has been under way for several months. Negotiations with Rocketdyne will start on September 16, 1964.

RL10 ENGINE

Due to funding limitations, OSSA is reportedly unable to pickup 1/3 of the RL10 R&D funding in FY65 as recently proposed by MSF. (MSF originally budgeted for the full RL10 costs for FY65.) OSSA will budget for their share of the dollars in FY66 and are counting on MSFC to handle the management and contracting through FY66, or as long as MSF is supplying a portion of the funding.

F-1 ENGINE

Following up the issue raised by Dan Driscoll during the Apollo Assessment Review last week relative to the weak outrigger strut problem on F-1 engine F-1002 (here at MSFC), the following actions were agreed upon:

1. Test Labs Spare Chamber was shipped back to Rocketdyne Saturday for modification via the Pregnant Guppy.
2. Estimated turn around time is 3 weeks for modification.
3. Test and P&VE Labs will endeavor to work out an acceptable plan to continue testing engine F-1002 in the interim, if safe to do so.

J-2 ENGINE

Flight type hardware will be used in the majority of all R&D testing from now through qual.

Three production engines are in various phases of acceptance testing. Engine 2007 is in test stand Delta-2A and should undergo acceptance test in a few days.

100-Pound Thrust Engine

The procurement plan for the 100-pound thrust engine was officially submitted to MSF September 2, 1964. The Request for Quotation (RFQ) is in preparation with a target date for completion of mid September.

GENERAL

As an example of what can be done in the engine programs relative to funding requirements, a reduction of approximately $35M in FY65 for F-1 and J-2 production could be implemented based on the stretched-out schedule Bob Young required we cost over this past weekend. This type of saving across the MSF programs would undoubtedly resolve most budget problems.

Pressure compensated pump inlet bellows are required on the F-1 engine due to the magnitude of the loads the pumps must carry under gimbaling conditions. The propellant flow rates of the F-1 and the position of the turbopumps result in the high loads. The J-2 engine has two complete and separate turbopumps, located diametrically opposite each other, eliminating the requirement for pressure compensated inlet bellows. It is understood that a more detailed comprehensive explanation is being prepared by P&VE for submittal directly to you in answer to similar questions you raised during your recent Lab tour with Dr. Seamans.

NOTES 9-8-64 CLINE

1. LOX DOMES - S-I-7: Following removal of the LOX domes from the engines of S-I-7, some of these plus others were placed in a salt spray cabinet for corrosion tests. Two domes of the same heat (HT-162-1) and the same transverse grain orientation as the dome which cracked on S-I-7 have cracked in salt spray, one in 29 days and one in 55 days. Two other domes in the same test, but with what we consider to be the correct grain orientation, have not failed.

2. KIWI B-4E: KIWI B-4E achieved 8 minutes full power operation 8-28-64. Analysis and inspection to date show all performance normal. A second run at full power for 2 minutes is scheduled for 9-10-64 prior to disassembly. (The eight minutes is a limit imposed by storage capacity for LH_2.)

3. NRX-A2: NRX-A2 reactor is on schedule for low-level firing 9-12-64 and a full power run on 9-18-64.

4. J-2 ENGINE CHILL REQUIREMENTS: Preliminary engine chill data has revealed:

(a) The system designed for engine chill on S-IVB/V is deficient.

(b) The engine chilldown systems on S-II and S-IVB/IB are marginal and possibly deficient (more data needed for definite conclusion).

Possible fixes are being evaluated.

5. TOROIDAL HOOP COMBUSTION CHAMBER: A 2 sec. duration firing (first run duration to exceed 0.5 sec.) was conducted on the single tube toroid combustion chamber. Operating conditions were 1260 psia chamber pressure and 2.6 mixture ratio. The tube condition was satisfactory with little or no erosion evident.

6. FAILURE OF MAIN LOX VALVE TO CLOSE DAMAGES H-1 ENGINE: (Reference NOTES 8-31-64 CLINE, paragraph 1.) Information concerning tolerance problem is being forwarded under separate cover.

7. CONFIGURATION CONTROL BOARD ACTION: (Reference NOTES 8-24-64 CLINE, paragraph 3.) Confusion existed about the use of scotch plastic film No. 546. One type has an adhesive side. The other is a plain plastic film. The plain plastic film is LOX compatible and has been used on all Saturn I, Block II vehicles. Therefore, no changes are required to replace the used plastic film.

Attachment #1: NOTES 8-31-64 CLINE
Attachment #2: NOTES 8-24-64 CLINE

NOTES 9/8/64 CONSTAN

Negative Report.

Blw 9/9, Fw 9/8

~~Bonnie!~~

B

Notes 9-8-64 DANNENBERG B 9/9

Meeting set up for 11:30 Tues 15 Sept 9th Floor Conf. Room

Fw

1. Inflight Experiments - The R&D Council on 9-4-64 accepted an internal MSFC organization plan to handle experiments for the Manned Space Flight Experiment Board. The plan will reach you shortly and needs to be implemented immediately. ✓

(Am I to attend?) Yes.

2. Repository - In connection with Dr. Mueller's request a plan to speed up the ICD operations was prepared and distributed. In compliance with the plan, the Panel Chairmen were requested to submit as much data as possible by 9-22-64. ✓

3. Boeing Saturn V Systems Engineering Proposal - The revised Boeing System Engineering and Integration Proposal is due at MSFC on 9-9-64 and the contract negotiation will begin on 9-14-64 at MSFC. ✓

A revised work statement for the Dynamic Test Stand Operation will be returned to Boeing for repricing. ✓

4. Saturn IB Launch Equipment Identification & Requirements Review- The dry run of the MSFC portion of this review will be incorporated into Mr. Fichtner's "Visibility" presentation on 9-9-64. The tri-Center dry-run will be held at KSC on 9-22/23-64 and the presentation to Gen. Phillips will be conducted on 9-30 and 10-1-64 at KSC. ✓

5. ESE Fabrication Mission- A decision was made by Mr. Fichtner, R-ASTR-E, to consolidate the ESE Fabrication Mission into the Design Mission. This will give GE the responsibility of design and fabrication of the ESE in one package and will be easier to manage. Necessary action is being initiated to secure Headquarters approval for this new approach. ✓

Kilburn at NTO: No wire sent to Hq. Discussed on phone w/ Roberts, Safety Ofc. and ~~[illegible]~~ today mailed a written report to Roberts. Questioned whether the fact that Corps is their agent, made it unnecessary for them to send.

fw 9/8

BF
Suggest you draft a suitable condolence letter to widow for my signature B

NOTES 9-8-64 FORTUNE

1. The first Construction Fatality was recorded on September 4, 1964. Mr. Carl Chrisco, employee of Central Gulf Company, subcontractor to Leavel & Kiewit Company, was struck by a Euclid at 3:10 a.m. and expired later at the Picayune Hospital. Circumstances surrounding the accident are being investigated by the Corps of Engineers.

What's that?

23-1

Newby - was the required report sent to WASH? fw

2. The International Brotherhood of Electrical Workers walked off the Navigation Lock, Site Maintenance and Warehouse Buildings for two days last week, with feather-bedding demand that the contractors hire stand-by electricians for second and third shifts whether needed or not. Dick Taylor, Federal Mediation Service, and our Government Labor Relations personnel persuaded them to return to the job, then take up the issue with the President's Missile Site Labor Committee. Since this had been offered to them previously and the strike brought no gain, but in actuality two days loss in pay, it is hoped this will be a lesson to the Union to mediate first. ✓

3. General Electric Reorganization - Bill Eaton says the Apollo and Mississippi Test Support Departments are being moved into the Missile and Space Division under Hillyard Page, effective September 15th. ✓ GE apparently had more capacity than business so is regrouping for different markets. ✓ In particular, their defense business has been falling off. The company is going abroad and acquiring data processing capabilities recently, buying French and Italian firms for this purpose. Jack Parker is to call you on this I understand.

Has done. B

Tw 9/8

NOTES 9/8/64 GEISSLER B 9/9

1. S-IVB Step Mixture Ratio: Re: your question on item 2, Notes 8/17/64 Geissler (copy attached) this subject. The answer to your question is yes, the liquid hydrogen tank is offloaded. At this time, certain studies are being conducted by Douglas on the method to be used for implementing the step mixture ratio. Since the tanks of the S-IVB are sized for a mixture ratio of 5:1, to achieve step mixture ratio, the LOX tank must be overloaded or the LH_2 tank must be off-loaded. Since the LOX tank is now full, the LH_2 tank must be off-loaded. The object of the mixture ratio step is, of course, to gain performance. This entire matter will be discussed in the next Flight Mechanics, Dynamics and Control Working Group Meeting with Douglas in late September.

2. MSFC Flight Operations Activities at MSC: The MSFC Flight Control Support Team at the MSC Flight Control Division presently consists of one Astrionics Civil Service engineer and four IBM personnel. The team thus far has determined the S-IVB/IU data flow requirements, prepared S-IVB/IU contributions to various Apollo Flight Operations documents, participated in specific IB flight mission planning activities and has satisfactorily fulfilled the MSFC commitment for supporting MSC in the planning and preparation of Apollo flight operations.

3. SA-7 Countdown Engineering Support for KSC: Similar to previous Block II flights and as a forerunner of Project LIEF operations, approximately 22 engineers representing 9 R&DO Divisions will be available in the Evaluation Center (Computation Laboratory) during the final part of the countdown. In response to the Launch Director (or MSFC management at the Cape) these engineers will answer any technical question or make technical recommendations as required. Approval of these nominations will be obtained. Blockhouse contact is Mr. O'Hara of Dr. Gruene's staff.

4. Angle of Attack Limit on SA-7: MSC (Jenkins) has published (8/24) limit values for the product vehicle angle of attack - dynamic pressure on SA-7 spacecraft. The critical limit is approximately 8 degrees at Q_{max} and is due to the bolts at the adapter to instrument unit interface. This does not agree with our results referring to the entire space vehicle based on P&VE data and leading to a 10.5 deg α-limit. The difference of 2.5° in angle of attack appears to be caused by (a) more conservative structural safety factors used by MSC, and (b) different assumptions on wind gusts. Efforts by P&VE are underway to resolve these differences; however, either α- limit is quite acceptable for September launch (the expected maximum in-flight angle of attack should not exceed 4 deg).

NOTES 9-8-64 GRAU

1. S-IU-9 INSTRUMENT UNIT CHECKOUT: The S-IU-9 Instrument Unit schedule has been revised and the Laboratory release date is now September 16, 1964. This, plus previously reported receipt of missing components and resolution of contamination problems, places the unit on schedule.

2. S-IV PROGRAM: The S-IV-9 stage is at Sacto undergoing post-static checkout. A special Electro-magnetic Compatibility test was performed on this stage August 25, 1964, and initial evaluation of the test indicates no major problems exist; however, final approval is awaiting a DAC report on non-certified test equipment and a complete evaluation of test data. Shipment to KSC is now scheduled for September 17, 1964. The S-IV-8 is on the test stand at Sacto undergoing pre-static preparations. S-IV-10 is at Santa Monica undergoing post-manufacturing checkout on schedule.

3. S-IVB BATTLESHIP: Manufacture of the S-IVB Battleship at Sacto is continuing with various day-by-day problems being encountered. A work plan consisting of 50 tasks has been established. Assembly was scheduled to have been completed August 24, 1964. At this time, the stage is approximately 80% complete in the manufacturing area.

4. S-IC-T PROPELLANT TANKS: Weld cracks in the S-IC-T propellant tanks continue to be a problem. Shaving of the welds has removed some of the cracks, however, not all defects have been eliminated. Further removal of material is anticipated where cracks still exist, and it may become necessary to perform repair. It has been concluded that hydrostatic testing of the tanks should be repeated. Schedule impact has not been determined.

5. PEGASUS: NASA Headquarters has directed a Pegasus Project review, tentatively scheduled for September 8-9, 1964 by an officially designated Pegasus Technical Review Team composed of personnel from Langley, MSFC, Goddard, OART, AMES, and JPL. The function of the team is to review the complete project with the exception of management and funding.

NOTES 9-8-64 GRUENE

Negative report -- LVO is preparing for Hurricane Dora.

NOTES 9/8/64 HAEUSSERMANN

1. PEGASUS PROJECT: Our Power Supply Group has completely redesigned the Pegasus power distribution unit. A breadboard of this unit has been successfully tested with the Pegasus System at Fairchild. Acceptance tests were successfully completed on the unit during the week of 8/31. We are also making a detailed review of the Pegasus wiring harness for the purpose of decreasing complexity and minimizing electrical interference. A scheme for accomplishing this was given to Fairchild last week, 8/31, but time will not permit the contractor to incorporate this change in Pegasus A. We, therefore, recommended that Pegasus A cabling be left unchanged and that the cabling improvements be made on Pegasus B.

2. ST-124-M CONTRACT: Negotiations were completed with EP-Bendix for the 26 ST-124-M stabilized platform systems at a total cost of $36.4M. Incentive provisions based upon cost, delivery, and performance were negotiated into the contract.

3. ASSIGNMENT OF COMMANDER HORTON: Mr. W. P. Horton (Commander, United States Navy - Retired) assumed his duties as my Assistant for Program Developments 9/1/64.

ASTR LAB.

CONFIDENTIAL

NOTES 9/8/64 HEIMBURG

1. F-1 ENGINE (STATIC TEST TOWER WEST):

The injector removed from engine F-1002 is being sent to Rocketdyne for further investigation. Rocketdyne indicated that they had experienced cracks between holes within a lox triplet, but had never seen cracks between triplets (see attached photograph). The cracks they have previously experienced have been caused by too much tin in the copper. The Materials Division of P&VE has been asked to follow up the investigation at Rocketdyne.

In a memorandum received from P&VE's Stress Analysis Branch, the following was recommended:

a. Conduct no gimbaling test on engines F-1001 and F-1002 with the existing turbopump struts.

b. A definite risk exists in firing these engines, even without gimbaling, with the existing turbopump struts.

Therefore, no firings will be made until a spare thrust chamber can be sent to Rocketdyne for modification, returned, and engine F-1002 rebuilt. This delay will move our next scheduled firing date to October 12.

2. S-I-10:

Reinstallation of the engines has been completed. Checkouts and preparation of the stage for the second propellant loading test and short duration firing, scheduled for 9/9 and 9/16, respectively, are progressing satisfactorily.

3. F-1 HEAT EXCHANGER TEST FACILITY:

On 9/3, a 60-second-duration test was conducted. Test data indicated that a lox coil failure occurred during the 59th second. Subsequent examination of the heat exchanger revealed a foreign object trapped in the coils. This object was identified as a part of the turbine simulator (water injection) chamber. The heat exchanger sustained extensive coil damage and will require replacement. The water injector is now being completely redesigned to preclude recurrence of this problem. It is estimated that the facility will be back in operation about 10/1.

ATTACHMENT: Photograph (attached to Dr. von Braun's and Mr. Weidner's copies only)

CONFIDENTIAL

NOTES 9-8-64 HOELZER

1. DATA CENTER PRESENTATION:

a. On August 25, 1964, a MSFC Data Center briefing was presented in P&VE Laboratory. Present were Reliability Engineering personnel of the various divisions, as well as representatives from the P&VE Laboratory Director's Office.

b. Interest centered about how the Data Center would assist in Parts Failure Analysis. It was determined that the Data Center can initially provide some assistance to this area with potential for much greater assistance as additional data is added in the future.

2. PHYSICAL SPACE IN THE COMPUTATION LABORATORY: The General Electric contract has been amended to allow for contractor leased facilities, and the General Electric contractor has acquired 3500 square feet of floor space in the Holiday Office Center. A study was made to determine how best to alleviate the critical space shortage for a temporary period pending occupancy status of the addition to Building 4663 now under construction. The space at the Holiday Office Center has been leased for approximately seven months.

3. SINGLE SUPPORT CONTRACTOR: Our General Electric support contractor is negotiating with IBM for IBM to continue the MSFC Data Center effort on a sub-contract basis. The present IBM contract expires September 12.

4. HUNTSVILLE SIMULATION SEMINAR: Mr. F. T. Shaver, Chief of the Simulation Branch, and Mr. R. Johnson, Manager of the Analog and Engineering Suboperation, General Electric, served as members of a four-man panel on "Simulation Techniques" at the Simulation Seminar held on August 26. Other panel members were Mr. J. Reich of the Lockheed Missiles & Space Company and Mr. D. Crockett of the Boeing-Huntsville Simulation Center. Approximately 75 engineers and scientists attended the 4-hour session, held at the Lockheed Research Center in Huntsville.

NOTES 9/8/64 JAMES

SA-7: Pre-launch checkout of SA-7 is proceeding on schedule toward the new launch date. Pre-launch review is scheduled today, 2:00-3:30 p.m.

S-IV STAGE NON-PROPULSIVE VENTING: Three possible solutions to the non-propulsive venting problem are being discussed. They are: (a) fuel depletion, (b) blow down through 2 of the hydrogen chilldown ducts, and (c) an additional 4" plenum with high flow capability in the forward innerstage. As of late Friday, P&VE and DAC are still studying the 3 potential solutions. Final resolution should be made by Tuesday or Wednesday of this week. DAC will make their recommended solution to MSFC today. Both P&VE and DAC apparently are leaning toward solution (c) above which would add a 4" plenum with high flow capability which comes out of the LH_2 tank manhole cover. Final resolution to this problem will be reported as soon as available.

PEGASUS: As discussed with you this week by telephone, there is some slip in the Pegasus schedule. The minimum amount for this slip would be the 6 days now shown by PERT; there may be much more. The Pegasus electronic canister is now going into vacuum soak and will be in this test about 2 weeks. We hope to have at least an indication as to whether we have a minimum slip in the program or whether the electronics design is a little "sick". Per the telephone conversation, we plan to brief you 9/18/64 at which time we should have some feel for the Pegasus status. ASTR and other Lab personnel who are participating in work at Fairchild will actively participate in the briefing and make constructive recommendations in their area of work.

S-IVB BATTLESHIP: Daily reports from SACTO indicate good progress in battleship program. It now appears that initial propellant loading will commence on Sept. 17. This is beginning of cold flow program and was the earliest possible date after the rescheduling.

S-IVB QUARTERLY REVIEW: S-IVB Quarterly Review has been rescheduled to Sept. 29-30. Technical portion will be conducted on Sept. 29 and the management portion on Sept. 30.

S-IVB GROUND TEST REPHASING: As a result of recent program assessment, DAC has been verbally notified to set the S-IVB Facilities Stage aside for possible later buildup for propellant system testing. DAC is to build up and deliver the All-Systems Stage to SACTO for propellant loading tests only and subsequent delivery to KSC for facilities checkout. No replacement for damaged Structural Test Stage is presently planned. Information gained from the stage instrumentation has been deemed sufficient to preclude requirement for a replacement test stage.

SATURN IB GSE: Saturn IB Launch Complex Systems Identification and Requirements Review has been rescheduled from Sept. 16-17 to Sept. 30 and Oct. 1 at KSC. Tri-center dry run will be Sept. 21-22 at KSC. The MSFC dry run will be included a part of Sept. 9 GSE presentation to you.

NOTES 9-8-64 Koelle

1. FY 1965 STUDY PROGRAM REDUCTION: Previously, MSFC was supposed to obtain 11.5 million out of 22.1 million dollars advanced study money. This has now been reduced to about 6 million, in order to conserve funds for new starts. The following tasks have - at this moment - a good chance to receive funding support and might end up at MSFC:

Earth Orbital		0
Lunar		
Lunar Exploitation Requirements		200K
Scientific Mission Concepts for Extended Lunar Exploration		500K
LESA Concept Integration		500K
Improved Saturn V Lunar Logistic System		800K
	Subtotal	2,000K
Planetary		
Mission Requirements		200K
Mars and Venus Flybys		200K
Nuclear Electric Ferry Vehicle		200K
Mars Surface Operations		200K
Support and Logistics		200K
	Subtotal	1,000K
Launch Vehicles		
Saturn Improvement		600K
Reusable Orbital Transport		800K
Post-Saturn		500K
Cryogenic Tanker		150K
Cryogenic Utility Stage		300K
Payload Bus (for Saturn vehicle)		200K
Launch Vehicle System Criteria		300K
Launch Vehicle Cost Studies		200K
		3,050K
GRAND TOTAL		6,050K

NOTES 9-8-64 KUERS

1. Reference Your Comments to My Notes 8-24-64, Copy Attached: Your remark to my notes refers to the Y-Ring segments joints, made by Boeing. You are right, there is no problem with these joints anymore. The Electron Beam Welding development for this same joint had been initiated as a back-up and weight saving program since the weld joint efficiency for EB welding is so much higher than achieved by the present conventional method. My statements were referring to the welds of complete Y-Rings into the tanks.

2. S-IC Welding Problems: A thorough investigation and inspection of all container welds has been conducted jointly by QUAL, P&VE, and ME personnel. The following facts have been established:

a. The surface cracks are so small and of such a nature that they could not be detected by X-ray examination or by visual inspection with naked eyes. This is the reason that these defects had not been discovered earlier. The new inspection method applied now consists of shaving the weld bead, etching, and dye penetrant check using magnifying glasses. Ultrasonic inspection seems also to be a tool for detection of such cracks. It is presently the consensus of opinion that these cracks have been present all the time without being noticed, and have not developed during hydrostatic testing.

b. The only true cracks observed during this investigation are associated with the termination of a weld produced either automatically or manually at weld repairs. The depth of the cracks extends to a depth of from 0.015" to 0.060". The majority of these cracks can be removed by shaving the weld bead flush with the parent material. Remaining cracks will be weld repaired using a new build-up technique, and reshaving of the excess material. Some small defects detected by the new inspection method in virgin welds (without repair overlap) are of a different nature, and are explainable as oxide lines, minute overlap of the rippled surface of weld providing an area of entrapment for dye penetrants, small surface porosity, etc.

c. Ultrasonic inspection of the welds on the lower forward bulkhead, which is inaccessable because of the forward exclusion riser gave also indications of small cracks. It has been decided, therefore, to remove a portion of the exclusion riser for closer inspection and correction of defects in this area.

d. A team of QUAL, P&VE, and ME personnel has been working over the week-end on two shifts, on both containers for the -T and -S vehicle. The operation is very time consuming because of the difficult accessability of the upper bulkheads. Both fuel and lox containers require complete recleaning and re-pressure testing after completion of all repairs. The experience and new techniques are currently being transferred to Boeing, S&ID, and DAC.

Septem 9, 1964

NOTES 9-14-64 BELEW

B 9/14

H-1 ENGINE

All H-1 engines for SA-8 have been retrofitted, hot fired, and shipped to Michoud for reinstallation on the stage. This completes the retrofit of Saturn I vehicle engines, four days ahead of schedule.

Negotiations for conversion of NAS7-162 (H-1 engine production contract) will begin on September 17, 1964. Pre-negotiation meetings will be conducted on September 14 and 15. A presentation will be given to General Phillips in Washington on September 16, 1964, regarding the conversion to incentive.

A presentation by Rocketdyne is tentatively scheduled the afternoon of September 17, 1964, regarding the selection of a 200K improved performance injector.

F-1 ENGINE

During the recent Apollo Assessment "dry-run", Dr. Rees questioned the use and long range corrosion implications of the sodium nitrite used in the F-1 chamber for start. The following is to clarify this subject in gross terms.

Rocketdyne and MSFC's Material Division contended that sodium nitrite is not corrosive in solution or deposits; however, it does leave a harmless white powdery residue which is eliminated in most part by the application of a water flush which is applied after the last test of a series of firings. In addition, the use of inconel X in the thrust chamber greatly reduces the susceptibility of the thrust chamber to corrosion.

Although sodium nitrite has two drawbacks, the powdery residue and a higher than desired freezing point, it is the best solution available at this time (after a rather extensive search by Rocketdyne and our Materials Division, Dr. Lucas).

Although the urgency to eliminate the need for the prefill is not very great at this time, effort toward this goal has been recently revived. One test on the thrust chamber stand with a dry start was made since our discussion resulting in an excessively "hard" start. Some effort will continue until conclusive results are available; however, results to date are not very promising.

RL10 ENGINE

After static firing of S-IV-9, oxylube contamination up to a size of 2500 microns has been found in the stages helium pneumatic system. The DAC connect point to the engines has been examined and contamination of up to 700 microns was found. The maximum allowable particle size is 100 microns. A sample of oxylube has been sent to Pratt & Whitney for contamination testing in engine systems. It is not known at this time whether or not this type and amount of contamination will affect S-IV engine performance.

J-2 ENGINE

In preparation for the FRT demonstration to begin January 1965, we are running limit tests in the R&D program. The upper temperature limit on chamber pre-chill before start is -100°F. In a recent test at a pre-chill temperature of approximately -80°F, with all other parameters at minimum limits (LOX inlet pressure 36 psia, hydrogen inlet pressure 28 psia, and start bottle pressure 1150 psia). The hydrogen pump stalled resulting in some overheating of chamber tubes. Additional analysis and testing will be required to determine validity of the present limit of -100°F. No impact relative to the vehicle is foreseen.

The production engine delivery schedule is being re-evaluated this week with Norm Reuel relative to our discussions in the Apollo Assessment meetings in Washington (not to over-buy hardware in the engine area).

Engine chilldown flow rate and pressure drop tests are continuing relative to propulsion systems chilldown on the S-IVB and S-II stages. Additional engine components are being insulated to determine the effect on heat loads relative to the total propulsion system chilldown problem.

NOTES 9-14-64 CLINE

B 9/14

1. F-1 ENGINE F-1001 INJECTOR DAMAGED: After the injector on Engine F-1002 was damaged, the injector on Engine F-1001 was checked with dye penetrant, and many small cracks were found between the triplet holes in the LOX rings. The spare injector will be used for testing. Cause of damage is being investigated.

2. J-2 ENGINE J2008 REPLACES ENGINE J2004 AS PFRT ENGINE: Engine J2004 failed to meet acceptance test requirements for the second time. After replacement of a fuel turbopump, Engine J2005, the backup to J2004, was damaged by a LOX fire in the heat exchanger area during acceptance testing and is being rebuilt. J2008 is therefore being used to replace.

3. CAMERA INFORMATION TO EDWARDS AIR FORCE BASE (EAFB): Detailed information on the LOX tank movie coverage as designed for the Saturn I vehicles SA-5, SA-6, and SA-7 has been forwarded to EAFB. EAFB plans to photograph vortex characteristics in some LOX tanks of their missiles. Based on their tight schedule, we have agreed to loan them any useful hardware.

4. KIWI B-4E: On 9-10-64 the KIWI B-4E successfully completed full cycle startup, buildup to full power, and controlled shutdown. This demonstrates the restartability of the KIWI reactor concept.

5. TOROIDAL HOOP COMBUSTION CHAMBER: (Reference NOTES 9-8-64 CLINE, paragraph 5) The 2 sec. duration firing was conducted on the single tube toroid combustion chamber at Santa Susana, California.

Attachment #1: NOTES 9-8-64 CLINE

NOTES 9/14/64 CONSTAN

1. General. The NASA - New Orleans Coordinating Committee, originally established in September 1961, had a reunion to note the progress made in the MSFC/Michoud Facility during the past three years. This meeting is being held on September 14, 1964, and includes a tour of Michoud Operations. Mr. James E. Webb is included in the party. ✓

B 9/14

2. Support Services, Michoud Operations. Seventy-five requests for proposals have been sent to prospective offerers for support of Michoud Operations during Calendar Year 1965. Preproposal conference will be held on September 16, after a plant tour on September 15. ✓

3. Boeing - Contract NAS8-5608. Revised proposal for SATURN V Systems Engineering and Integration Support was received on September 10, 1964, in the amount of $121,000. Prenegotiations will be conducted September 10 and 11, with negotiations commencing September 14. ✓

→ X10³ B

4. Bulkhead Welds. As a result of the discovery of crater cracks in the bulkhead welds of S-IC-T, an investigation was conducted to determine if these cracks were also evident in the S-IC-S bulkhead fabricated at Michoud. It was most important to investigate this "S" bulkhead to isolate any differences in fabrication techniques between Michoud and MSFC. Following weld bead shaving, etching and dye checking, extensive cracks were discovered on the S-IC-S bulkhead. These cracks are basically the same as those which MSFC is experiencing on "T". The investigation is continuing to determine the corrective action and repair techniques. The bulkhead which was fabricated at Michoud for Vehicle 501 was previously rejected because of excessive mismatch and tenting. Prior to disposition of bulkhead the welds will be shaved, etched, and dye penetrant inspected to provide additional engineering data on the crack problem. ✓

5. S-IC-T. A mockup review and design freeze meeting is being conducted at Michoud on September 15, 16, and 17. This program is under the sponsorship of Dr. Mrazek and Mr. Wilkinson of Boeing. ✓

6. CCSD.

a. Status of SA-D-5. Cleaning of and preparing all tanks for painting in process. ✓

b. Status of SA-8. Temperature gages in 7 tanks are to be removed for pressure test. Temperature and liquid level probes are to be removed and new ones installed (new probes are available). Thermo-lag installation (tail section) in process. Four engines for Vehicle S-I-8 have been received from Rocketdyne, Neosho, after LOX dome retrofit. ✓

2. B

B 2.

c. Status of S-IC-1. Installation in process:

(1) 60° shrouds
(2) Brackets for fuel pressure system
(3) Static fire tubing

Notes 9-14-64 DANNENBERG

B 9/14

1. Saturn V Operational Displays - The Source Evaluation Board is now in process of evaluating the contractor's proposals and has set a target date of 9-20-64 for completion. A presentation will be given to you on 9-24-64 at 2:00 p.m. ✓

2. Boeing Saturn V Systems Engineering & Integration Support Proposal -The revised Boeing proposal was received on 9-9-64. Negotiations are to begin today. The revised total cost proposal is for $121 Million, a reduction of $157 Million from the original proposal cost. ✓

3. Crew Safety - MSC and MSFC agreed upon the Saturn V Design Criteria for On-Board Emergency Detection Systems. Do you want a briefing? Yes B

Astronaut C. Williams and members of MSC Crew Safety Panel will visit MSFC on 9-15-64 for discussions and tours of ME, P&VE and TEST Labs. ✓

4. NASA - DOD Coordinated National Launch Vehicle Cost Study for AACB Report on 9-15-64 - Titan III (five configurations) costs for proposed follow-on programs were very low compared to Saturn IB, even though all Titan III contractors have indicated substantial overruns for the present R&D program. R-SA feels that NASA - DOD will not be able to meaningfully cost future launch vehicle programs from the type of cost information submitted in these combined studies. ✓

Frank G. B

NOTES 9/14/64 FORTUNE B 9/14

1. Call From Senator Stennis was received Tuesday morning. He said that he had worked hard to get our appropriations through and wanted to make sure there was no holdup in our receiving all money due Mississippi Test Facility. I told him we anticipated no problem, mentioning Drs. Seamans' and Mueller's visit and their interest in our progress. He offered to help with any problems that we might encounter and inquired into two other matters which I have reported to Harry Gorman. After reflecting on his closing remarks that "Now we've got to get this election out of the way," I wonder if he was hinting that we should get our FY-65 C of F funds committed as soon as we can.

2. Prospect of Contract with Southern Bell Telephone and Telegraph Company appears good. Meeting with their representative Friday, September 4, went well. We are expecting to hear results of their New York office review this week.

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NOTES 9/14/64 GEISSLER

B 9/14

1. "Apollo Experiments Support": This is the latest title for what was previously called ALSS. Indications from NASA Headquarters are that 20.0 million dollars will be made available for Apollo Experiments Support from OMSF. An additional 6.1 would come from OSSA. MSFC can expect to receive 7.4 from OMSF and 2.1 from OSSA. Total MSFC 9.5 as follows: Lunar Roving Vehicle (MOLAB), 4.0; Lunar Flying Vehicle, 1.5; LEM Truck, 1.5; Surface Payloads Engineering Support, .4; Scientific Mission Simulation, .3; and Surface Scientific Equipment, 1.8. The detail breakdown for how to spend these funds is fully coordinated with Ed Gray and Bill Taylor.

2. Status of Apollo Experiment Support and Saturn IB/Centaur (Formerly ALSS): According to the best available information Dr. Mueller has signed Project Proposals for both subjects and is preparing letters to you, Dr. Debus, and Dr. Gilruth informing you and them of his acceptance of the Project Proposals and requesting that the necessary implementation steps be taken. Dr. Mueller is waiting until the basic allocation of funds at NASA Headquarters is accomplished before submission to Dr. Seamans.

3. Pegasus in Circumlunar Orbit: Bill Taylor relayed a request by Dr. Mueller to identify what capability exists and what benefits can be reaped by putting Pegasus into trajectory which circumnavigates the moon. A written request for about a 10 day investigation is expected on Monday. This is fully in line with our proposals of 1/2 year ago on this subject matter which were not accepted at that time. Mr. de Fries has set up an effort to answer Mr. Taylor's telephone request with a brief exposition of such a mission. AERO, RP, P&VE, IO are being pulled together by Mr. de Fries for this effort.

4. Pre-proposal Conference for Mission Support Contract: This laboratory's pre-proposal conference was held Thursday, September 3, 1964. 31 people representing 16 companies were present. The Request for Proposal was sent to 107 companies. Proposals are due October 7, 1964. Companies represented at the conference were: General Applied Science, General Electric, Gulton Industries, Northrop Corp., Radiation Service Co., Raytheon Co., Thiokol, Atlantic Research, Brown Engineering Chrysler, General Dynamics, Hayes International, Lockheed, Marquardt Corp., NAA, and Acoustica, Inc.

5. Dora: Hurricane Dora produced the following peak ground wind readings for LC 34 and 37 area at Cape Kennedy:

Height (MSL) (meters)	Peak Wind (m/sec)	Date/Time	Design *Hurricane Wind Values Defined by MSFC for Cape Area (m/sec)
101	45.8	Sep 9 2:43 p.m.	59.5
72	35.1	Sep 9 1:38 p.m.	56.5
19.5	40.0	Sep 9 1:43 p.m.	45.1

*Basic wind criteria, any structural safety factors are in addition.

NOTES 9-14-64 GRAU

B 9/14

1. S-IU-9 INSTRUMENT UNIT CHECKOUT: Checkout of the S-IU-9 Instrument Unit continues on schedule with only minor problems. Installation of several outstanding E.O.'s could result in a slight delay in the checkout schedule. No problems are anticipated from the delay, however, in that a relaxation of the overall schedule seems likely with a shipping date change from September 23 to September 28, 1964.

2. S-IV PROGRAM: The S-IV-9 stage continues in post-static checkout at Sacto. Contamination problems exist and are under investigation. The Control System, Electrical System, and first priority Instrumentation System checks have been completed, remaining tests are the RF Systems and the Simulated Flight. The S-IV-8 stage continues in pre-static test operations on the test stand at Sacto. The S-IV-10 stage is nearing completion of manufacturing at Santa Monica. The outstanding problem on this stage concerns contamination of the type being encountered on the S-IV-9 at Sacto. This contamination is being traced through the system at present and the source of and corrective action for the problem is being actively pursued by DAC engineers.

3. PEGASUS: Fairchild is setting up a separate electronics production line in their Rockville, Maryland facility. This production line will be manned by SPACO personnel. Further, it is understood that Fairchild is considering the possibility of subcontracting for manufacture of the third mobile Capsule Checkout Unit. Care will have to be taken to assure uniform product quality under these circumstances.

4. CHECKOUT EQUIPMENT FOR CCSD, MICHOUD: Control Room "B" equipment is being removed from building 4708 for shipment to Michoud. The Packard Bell and peripheral equipment will be used for a program verification station. Modification of any of the equipment to S-IB configuration will be accomplished by CCSD. Shipment of all equipment is expected by the last week in September.

5. STATUS REVIEW OF S-IC TEST AND CHECKOUT ACTIVITIES: A presentation was made by Boeing to this Laboratory last week, at which time the general status of test plans, test procedures and GSE were discussed. Currently, it appears that several items of GSE hardware are 16-20 weeks behind schedule; however, Boeing indicates that action is underway to expedite delivery and develop work around methods to avoid late delivery of the Quality and Reliability Assurance Laboratory Test and Checkout Station.

NOTES 9-14-64 GRUENE B 9/14

SA-7 Status

1. SA-7 withstood Hurricane Dora without damage, nor was any damage to the equipment in the Complex 37 area detected. Some electrical deficiencies which occurred on the service structure were corrected immediately.

2. Weather prediction for the scheduled launch day seems favorable for the Cape area, but questionable for downrange stations and camera recovery due to Hurricane Gladys; however, the very latest forecast (11:00 a. m. EST) indicates a turn to the North which would eliminate recovery problems. ✓

NOTES 9/14/64 HAEUSSERMANN B 9/14

No notes this week except for the attachment,* Service Module LEM Adapter (SLA) Panel Deployment/IU Antenna Problem, which is provided for your information.

* Attachment provided DIR and R-DIR only.

NOTES 9/14/64 HEIMBURG

B 9/14

1. F-1 ENGINE:

The injector on F-1 engine F-1001 was removed, dye checked, and found to be cracked similar to the one in engine F-1002, although not as severely. The total time and starts for each injector are as follows:

IGNITION	TOTAL TIME (SEC.)	STARTS
F-1001	598.6 MSFC	19 MSFC
	192.6 Rocketdyne	4 Rocketdyne
	791.2 Total	23 Total
F-1002	570.8 MSFC	14 MSFC
	328.1 Rocketdyne	7 Rocketdyne
	898.9 Total	21 Total

Rocketdyne did not receive the F-1002 injector until 9/10; therefore, no status report is presently available. If the hardware remains on schedule, the next firing will be 10/12.

2. S-1-10:

A propellant loading test was performed on 9/9. During the flight sequence test, the fuel tank pressurization malfunctioned due to an error in the electrical automatic circuitry. Different lox topping and helium bubbling configurations were tested to fulfill the 2.2% ullage requirements for the launch site.

Silly Mrazek FYI B

A second propellant loading test on 9/10 was terminated as a result of a lox leak at the center tank bottom manhole cover. Subsequently, the gasket has been exchanged using the prescribed procedure. The exact reason for this failure is not known; investigation is continuing. This is the second similar occurrence in as many stages (S-1-8 and S-1-9). KSC and P&VE personnel have been informed of this situation.

Engine checkouts are complete, and the short duration firing is scheduled for 9/16.

3. F-1 HEAT EXCHANGER TEST FACILITY:

Reference NOTES 9/8/64 HEIMBURG. Lox coil failure was our goof. Corrective action is being taken. This incident will have no adverse effect on the F-1 heat exchanger test program.

ATTACHMENT: NOTES 9/8/64 HEIMBURG (to Dr. von Braun's and Mr. Weidner's copies)

B 9/14

NOTES 9-14-64 HOELZER

1. PRESENTATION TO DR. STUHLINGER: Representatives of R-COMP-AD made a presentation to Dr. Stuhlinger, R-RP, on August 24, 1964, concerning design of the requested Research Projects Contractual Reporting System. Dr. Stuhlinger has concurred with this concept, which will result in a mechanized information system pertaining to advanced and supporting research contracts.

2. UTILIZATION OF TRANSMISSION NETWORK:

a. A system has been designed, utilizing data transmission equipment, to communicate with DLSC (Defense Logistics Services Center, Battle Creek, Michigan) on information required in the maintenance of the MSFC Federal Supply Catalogs. This same system will be utilized to requisition supplies and materials for Army depots and General Services Administration, thereby reducing procurement cycle time.

b. The system will be in operational checkout status the first week of September and in production operation the second week of September.

3. T. V. GUIDANCE SIMULATOR: Approximately 25% of the necessary design effort for the T. V. Guidance Simulator has been completed. Deflection amplifiers and optical path have been defined and facilities are being readied so that the remaining electronic design and some parallel fabrication may be commenced. Nearly all necessary parts are on-hand, with some parts in the requisition process.

4. APOLLO INTERFACE CONTROL DOCUMENTATION COMPUTER SYSTEM: At the request of Mr. K. Dannenberg (Director of the Systems Office), a crash effort has been initiated for implementation of the Apollo Interface Control Documentation System. This system will serve as a tool to assist coordination of interface design documentation. A target date of December 1, 1964, has been established for completion of this system.

5. NEW TAPE CERTIFIER: The Computation Laboratory has just received a new magnetic tape certifier that will allow extensive reclamation of used magnetic tapes through cleaning and recertification and reissue to the using agency. The Laboratory proposes to support Slidell and the Cape in the cleaning and recertification of their magnetic tape.

6. NATIONAL SIMULATION SEMINAR: Mr. F. T. Shaver, Chief, Simulation Branch, attended the Third Annual Simulation Seminar at Breckenridge, Colorado last week. This seminar was attended by 32 people representing leading industry, government, and educational simulation installations. Current problems and developments and future requirements in the simulation field were discussed in four sessions chaired by Dr. Howe, University of Michigan, Mr. Schomburg, North American Aviation, Mr. Quirk, Boeing, and Mr. Shaver.

NOTES 9/14/64 JAMES

B 9/14

SA-7: Launch date for SA-7 has slipped one day to September 18 due to Hurricane Dora.

SA-9: Since Pegasus "A" is a minimum of one week late, the shipping dates for SA-9 stages have been delayed. S-I-9 is rescheduled to be shipped no earlier than September 19. S-IV-9 is rescheduled to be shipped via Pregnant Guppy to arrive at KSC on September 20 and unloaded September 21. I. U. -9 will be shipped from MSFC via Pregnant Guppy on September 28. These revised shipping dates will be confirmed or changed at the Pegasus Review now scheduled for September 17 rather than September 18.

S-I-10: Static test operations are proceeding. Additional propellant loading tests to achieve the 2.2 percent ullage were performed on September 10. Short duration static firing is scheduled for September 16.

S-IV STAGE NON-PROPULSIVE VENTING: As indicated in the SA-7 Prelaunch Review last Tuesday, the solution to the venting problem will be the addition of a 4" plenum with high flow capability which comes out of the LH_2 tank manhole cover. This will be added to S-IV-9 and subs in addition to the non-propulsive venting system now installed on S-IV-7.

S-IV STAGE PHASEOUT: This office has initiated action to identify specific areas of responsibility and potential problems in closing out the S-IV contract with DAC. Areas of investigation include termination and closeout inventory, utilization of facilities, final audit, and evaluation of contractor performance. To date, action has been initiated to alert MSFC Laboratory personnel to the availability of S-IV equipment and to encourage them to claim any excess S-IV equipment they require.

PEGASUS: In preparation for the September 17 Pegasus Review with you, representatives of the Pegasus Office, Bob Pace and I are meeting with Dr. Haeussermann and his people at 3:00 today to review the problems and status of Pegasus. The Monthly Pegasus Review with Headquarters will be held Wednesday, September 23 at 9:00 a. m. at MSF.

S-IVB BATTLESHIP: Initial propellant loading of S-IVB battleship is scheduled for Thursday, September 17. All activities leading up to this event are on schedule although the schedule is tight.

NOTES 9-14-64 Koelle

B 9/14

1. FY 1964 ACTIVITY SUMMARY: In my NOTES of 8-31-64, I reported that 245,000 direct man-hours were charged to advanced system studies throughout MSFC. I also gave a breakdown of these man-hours according to offices and laboratories. My office, as cognizant office, was charged with 92,000 out of 245,000 man-hours ($\equiv$ 37.6 percent), which enables me to break these down further as follows:

Launch Vehicles	52%
Lunar Systems	20%
Orbital Systems	19%
Planetary Systems	9%
	100%

Fifty-one percent of our work served to improve the performance and/or utility of presently approved systems (Saturn Improvement 19.9; Launch Vehicle Cost 6.0; ALLS 9.8; and Orbital Operations Techniques, including Human Factors 15.4 percent).

Detailed man-hour charges by projects were as follows:

Cost Analysis	5,520	=	6.00%
Human Factors	3,194	=	3.47%
Reusable Orbital Transport	7,058	=	7.66%
Saturn IB Improvement	4,823	=	5.24%
Saturn V Improvement	13,596	=	14.67%
Post-Saturn	12,167	=	13.20%
Nuclear Orbital Booster	2,077	=	2.25%
Nuclear Pulse Vehicle	2,356	=	2.56%
Orbital Launch Operations	14,213	=	15.42%
Advanced Lunar Transportation	4,618	=	5.01%
MOLAB/HOPPER	8,928	=	9.80%
Lunar Station (LESA)	4,398	=	4.78%
Planetary Exploration, General	3,688	=	4.00%
Mars and Venus Missions	5,102	=	5.54%
Others	390	=	0.40%
Total	92,128	=	100%

In addition to the direct man-hours above, a total of 25,047 indirect man-hours were charged to the FPO cognizance number.

B 9/14

NOTES 9-14-64 KUERS

1. Correction of Weld Defects on S-IC-T Containers:

a. All cracks in the welds of the Lox Container have been removed by shaving and grinding. In some places it was necessary to grind below the surface of the parent material as deep as .125". It has been determined by P&VE that 16 or 18 places require weld repairs. The Fuel Exclusion Riser in the Fuel Container has been partially removed. Shaving and grinding of cracks is almost complete. ✓

b. Metallurgical investigation of various weld termination techniques indicates that the best system developed to date applicable to S-IC hardware will be the build-up of a nugget at the completion of any weld. This nugget allows metal to continuously flow into the cooling puddle during the shrinkage phase of freeze-out, thus eliminating any cracking potential in the weld. ✓ This excess nugget material will be shaved flush with the remaining weld. This is the same principle as using risers in metal casting. ✓ Repair samples made by this method are presently in Dr. Lucas' shop for evaluation. We hope to start making repairs today. ✓

2. Cable Installation on S-IC Mock-Up: We have used our S-IC Thrust Structure Mock-Up for determination of cable lengths and cable routing. From this installation it has become apparent that the cable trunks are very bulky and heavy, requiring sound supporting for which no adequate provision has been made.

Billy Mrazek
FYI
B

B 9/14

NOTES 9-14-64 MAUS

1. GENERAL MANAGEMENT (ADMINISTRATOR'S) PROGRAM REVIEWS - By separate memorandum, we are publishing the schedule for the 1965 Program Reviews which are held once a year by Mr. Webb on each major NASA program. The first of these reviews is to be held on Sept. 22, on Communications; Meteorology; Advanced Technological Satellites at 8:45A.M. -12:15; and Geophysics & Astronomy; International Programs at 1:15A.M.-4:45. This year, instead of the review being held on Saturday mornings, it will be held on Tuesday. NASA attendance will be limited to top level management. Your seat will be provided (for all reviews) by MSF. A repeat of the review will be held on the next day (Wednesday) for the benefit of additional NASA and field center personnel. We will coordinate MSFC participation.

H.M. I told Bonnie which of these reviews I plan to attend. Suggest someone else attends those I cannot attend B

2. APOLLO PROGRAM DEVELOPMENT PLAN (PDP) - Gen. Phillips requested comments direct from the Saturn I/IB, Saturn V, and Engine Program offices on the MSF draft Apollo PDP. We have met with representatives of IO, R&DO, and the Program Offices and agreed that any comments submitted to MSF should represent a coordinated Center position and should be signed by you. Review is now in process and submission is tentatively scheduled for September 25.

3. BOB VISIT - A team of BOB representatives, headed by Don Crabill will be at MSFC the week of Sept. 28. The team visited KSC last month (we have complete data on that visit) and is at MSC this week. Their interests will mainly be in the area of resources requirements: manpower, funds, and facilities; how the requirements are determined, allocated, justified, and utilized. They will also have an interest in organizational interfaces, and in long range plans. We will develop an agenda in cooperation with MSF.

Make this First Class! B

4. POP 64-3 PROGRAM ADDITIONS - No change in status since my Notes last week. However, Drs. Mueller, Newell and Bisplinghoff are to meet informally Saturday, Sept. 19, to reach agreement as to which new start all three of them will support. Meantime, Dr. Mueller does not plan to submit any program additions for Dr. Seamans' approval.

Ernst Seidles FYI B

5. NATIONAL LAUNCH VEHICLE STUDY - The Saturn IB Cost Data for the National Launch Vehicle Study was completed within the time frame agreed to by NASA and DOD senior representatives. Our material was delivered in preliminary form on Sept. 2 to Joe Malaga, who was appointed by Dr. Seamans to head the cost phase of the study. The comparison effort has been stopped due to disagreement between DOD and NASA representatives on the basic approach to the study, primarily on level of cost detail. The NASA hdqs. and DOD representatives returned to Washington this past weekend.

Mr. Webb has decided that the Bureau of the Budget will be asked to arbitrate; initial meeting with BOB is being held today. We are remaining in contact with the NASA headquarters representatives.

B 9/14

NOTES 9-14-64 McCartney

1. PROPOSED CONSOLIDATED MANAGEMENT OF SUPPORTING RESEARCH AND TECHNOLOGY (SRT) PROGRAM: In my 5-18-64 NOTES to you, I reported that my staff, in cooperation with the Research Projects Laboratory, was developing an R&D Operations policy paper on management of our SRT programs. That action has culminated in a comprehensive study aimed at consolidated management of these programs. Dr. Stuhlinger is to present to Mr. Weidner, this week, a definitive proposal, and we are hopeful that the management of the SRT programs will be consolidated in the very near future.

2. INCENTIVE AWARD FEE EVALUATION SYSTEM: Last week, COMP presented to R-DIR the system used for evaluating Incentive Award Fees. That system includes the requirements cited by Dr. Mueller, in August, for effective award fee administration. My office is now working closely with Purchasing and Mr. Newby's office to develop, with the R&D Operations' Laboratories, a uniform approach to Incentive Award Fee systems.

3. MANPOWER REVIEWS: At the invitation of Mr. Newby, representatives of R-DIR and my office will attend several of the Center staff office manpower audits which are scheduled this week.

4. RESOURCES MANAGEMENT CONFERENCE: The regular Resources Management Conference, attended by the Laboratory Resources Managers, was held last week. Among the current problems discussed was the difficulty being encountered by the laboratories in implementation of the Short Form Procurement Plan procedure. Each laboratory is supplying their experiences in order that we may evaluate areas which may need improvement.

5. SOURCE EVALUATION BOARD ACTIVITIES: On September 12, the Purchasing Office issued the final laboratory Request for Proposal for single-support contractors. The Board will meet September 16 to initiate evaluation of the first set of proposals for TEST.

ATTACHMENT: NOTES 5-18-64 McCartney

NOTES 9/14/64 RUDOLPH

1. S-IC Stage:

Test Fuel Tank - The area of the Test Fuel Tank which collapsed during the previous attempt to hydrostatically test the tank is still being examined for structural defects. Three small cracks have been observed on the X-rays of the collapsed section which were not shown on the original X-rays. These cracks will be checked more closely with ultrasonic techniques to determine the seriousness of the defect. Meanwhile, strain gage installation in the Test Fuel Tank is approximately 75% complete. Hydrostatic testing has been rescheduled to start on September 25, 1964, providing the defects mentioned above do not prove serious.

S-IC-S and S-IC-T Tanks - The weld beads for the S-IC-S and S-IC-T Fuel and LOX tanks are being shaved, reinspected, and repaired. This is a result of visually detected weld cracks on the -T and -S components. Upon completion of the operations the tanks will be recleaned and hydrostatically tested.

S-IC-1 and S-IC-2 Tanks - Welding of the fittings onto bulkheads and base to apex gore welding is proceeding on the S-IC-1 and S-IC-2 tanks. These weld beads are being shaved and inspected for cracks as the buildup progresses. These operations are presently ahead of schedule; but congestion at the meridian weld turntable is expected to impact the final bulkhead fabrication schedule.

2. S-II Stage:

Common Bulkhead Test Facility - The construction of the common bulkhead test facility to be located at Santa Susana will start on schedule in September. Design has been completed, bids evaluated, and a construction contractor selected on September 10, 1964. Construction is estimated to take 120 days and is scheduled for completion considerably ahead of delivery of the common bulkhead test tank to Santa Susana. Dan Driscoll was asked if Test Laboratory would be willing to undertake this job, his answer was no - that he is too heavily committed and could not accomplish the job according to the schedule requirements stated by S&ID.

Contractor Survey - The detail survey of activity (manpower and effort) at S&ID is scheduled to start in Downey, October 5, 1964. Detailed information is being obtained from MSC, regarding their Apollo survey. During the week of September 14, 1964, we will pull together the MSFC task teams and further plan in detail the method of operation, the data to be obtained and methods of implementing program revisions which evolve from the survey.

F.R.,
Let's make this a 1st class exercise! We'll be in overall charge? B

B 9/14

NOTES-9-14-64-SHEPHERD

FY-66 CofF: The MSF Facilities Review Board met on September 10, 1964, for a final review of the FY-66 program. MSF is to submit the budget to Dr. Seamans's office on September 15. All items that we had previously submitted were approved and, in addition, the Facilities Review Board approved:

a. the dispensary

b. Special Fluid Mechanics Laboratory - This was approved for $2.8M and has excellent possibilities of being passed by Dr. Seamans. As a result of your conversation with Dr. Seamans and Dr. Mueller on the plane to MTO, Dr. Seamans had a study made by Al Crobaugh. The results of this study indicate that the best solution is to locate the facility at Huntsville. ✓✓

c. acquisition of the Green Mountain property - The Board understands we are considering two alternative courses of action at this time (1) to buy the land, and (2) to lease. ✓

1) Jerry McC
2) E Geissler
FYI
B
(Let's not jubilate too soon!)

B 9/14

NOTES 9-14-64 Stuhlinger

1. PEGASUS TECHNICAL REVIEW TEAM: I spent the entire past week with the Pegasus Review Team. According to our chairman, we will spend the better part of this and the next week on this activity. A report will be submitted to Dr. Bisplinghoff in early October. The team is obligated to treat the findings as privileged until the report is submitted. ✓

2. RESEARCH PROGRAM CONSOLIDATION: RPL will present its proposed plan for research program consolidation to R&DO Management on September 15. Subsequently, I would like to present the plan to you according to your earlier desire, before it will be presented to the MSFC staff. ✓ O.K. B

3. SI (METRIC) UNITS: In response to your inquiry of August 25 regarding coordination of Dr. Speer's and Dr. Mechtly's work on SI units, I wrote you a memorandum in which the joint work of Dr. Speer, Dr. Mechtly, and other members of MSFC, and the present status of the project are described. ✓

4. UNIVERSITY OF ALABAMA, HUNTSVILLE: Mr. Clyde Reeves and Dr. Arendale, newly appointed Assistant Director at the Research Institute, visited Dr. Shelton on September 10. The requirements for the academic program are growing rapidly. Mr. Reeves said that many more professional members of MSFC may be drafted for teaching before long. Official figures for the Fall registration, expected to be surprisingly large, should be available soon. ✓

5. U. S. OBJECTIVES IN SPACE: According to Dr. Gerathewohl, President Johnson is expected to make an announcement of future U. S. objectives in space (including selection of scientist-astronauts) sometime in October. ✓

NOTES 9/8/64 HEIMBURG

1. F-1 ENGINE (STATIC TEST TOWER WEST):

The injector removed from engine F-1002 is being sent to Rocketdyne for further investigation. Rocketdyne indicated that they had experienced cracks between holes within a lox triplet, but had never seen cracks between triplets (see attached photograph). The cracks they have previously experienced have been caused by too much tin in the copper. The Materials Division of P&VE has been asked to follow up the investigation at Rocketdyne.

In a memorandum received from P&VE's Stress Analysis Branch, the following was recommended:

a. Conduct no gimbaling test on engines F-1001 and F-1002 with the existing turbopump struts.

b. A definite risk exists in firing these engines, even without gimbaling, with the existing turbopump struts.

Therefore, no firings will be made until a spare thrust chamber can be sent to Rocketdyne for modification, returned, and engine F-1002 rebuilt. This delay will move our next scheduled firing date to October 12.

2. S-I-10:

Reinstallation of the engines has been completed. Checkouts and preparation of the stage for the second propellant loading test and short duration firing, scheduled for 9/9 and 9/16, respectively, are progressing satisfactorily.

3. F-1 HEAT EXCHANGER TEST FACILITY:

On 9/3, a 60-second-duration test was conducted. Test data indicated that a lox coil failure occurred during the 59th second. Subsequent examination of the heat exchanger revealed a foreign object trapped in the coils. This object was identified as a part of the turbine simulator (water injection) chamber. The heat exchanger sustained extensive coil damage and will require replacement. The water injector is now being completely redesigned to preclude recurrence of this problem. It is estimated that the facility will be back in operation about 10/1.

ATTACHMENT: Photograph (attached to Dr. von Braun's and Mr. Weidner's copies o

attachment

B 5/18

NOTES 5-18-64 McCartney

1. MANAGEMENT POLICY FOR RESEARCH AND TECHNOLOGY PROGRAMS: In coordination with the Research Projects and Future Projects Offices, my staff has been developing an R&D Operations policy paper on management of our assigned research and technology programs. The intent is to establish a clear-cut functional management system for these programs within R&D Operations. We are now in final stages of preparation. Early in June, I expect to present the coordinated position to R&D Operations management for review and decision. ✓

2. COMPUTATION LABORATORY RESPONSIBILITIES: During a May 7 meeting with Dr. McCall, Computation Laboratory, and members of my Operations Engineering Group, it was agreed that Computation Laboratory will provide all computer programming services for Marshall. Certain labs now provide their own programming services. Plans are now being completed to transfer these services to COMP. Necessary manpower adjustments are being made in COMP's single support contract. COMP and R-RM personnel will visit each involved laboratory to assure smooth transfer of responsibility and minimize manpower impacts. ✓

3. SATURN I FY-64 BUDGET: On May 15, $4.5M were reprogrammed to IO. About $1.8M remains uninitiated and will be used to maintain routine operations for the balance of the fiscal year. ✓

4. FY-65 BUDGET PLANNING: On May 12, we were advised that IO management had decided to cut the FY-65 Saturn I Vehicle Support funds in half: from $14.3M to $7.3M. We understand that the decision was made because Saturn I engineering effort was too heavy, considering the lateness of the program. A preliminary look indicates that the reduction will seriously affect the R&D Operations Mission Support requirements. My budget people are now analyzing the impact. In doing so, they are working closely with my Manpower Group, which is making a mission support study to determine total mission requirements for all the laboratories. ✓

5. RESOURCES MANAGERS CONFERENCE: The fourth Resources Managers Conference was held May 12. My staff is following up problems disclosed during the meeting. ✓

6. SUMMER STUDENT PROGRAM: R&D Operations has been allocated 119 (of 160) summer students. On May 12, we distributed the apportioned spaces to the laboratories. ✓

SEPTEMBER 21, 1964

OFFICE OF DIRECTOR – MSFC

CODE	NAME	INIT.	☐ ACTION	☐ INFORMATION
DEP-A	Mr. Borman			

REMARKS

CODE	NAME	DATE
DIR		10/1/62

MSFC - Form 495 (Rev August 1963)

NOTES 9-21-64 GRAU

B 9/27

1. S-IU-9 INSTRUMENT UNIT CHECKOUT: Final checkout of the S-IU-9 Instrument Unit was satisfactorily completed and the unit released to Manufacturing Engineering Laboratory September 18, 1964.

2. S-IB ACTUATOR CONTAMINATION: A representative of this Laboratory traveled to Chrysler Michoud to check out S-IB hydraulic components sampling and analysis operations after failure of five (5) actuators. The failures were attributed to contamination from ground support equipment. It was found that the contamination problems resulted from the analysis techniques being utilized by Chrysler. These techniques are now being revised to provide adequate analysis. The actuators were returned to Moog, and the ground support equipment was cleaned to an acceptable level for testing components.

3. DAC VENDOR SURVEY: Patterned after the surveys of vendors of Boeing and NAA/S&ID which were conducted in the last few months, DAC vendors in the Los Angeles area were visited last week by a team of which I was a member. Results were remarkably different from those of previous surveys in that DAC keeps close contact with its vendors, has a formal communication system in operation, gives good instructions to the vendors as to purpose and technical requirements of the items to be purchased, and furnished prompt answers to questions raised by vendors during the life of the contract. The close cooperation between DAC procurement people, quality engineering people, and designers is commendable. Therefore, only a comparatively small number of action items result from this survey on the DAC and the MSFC side.

4. INTERPRETATION DIFFERENCES OF NPC 200 SERIES DOCUMENTS: Although the talk about different interpretations of the NPC Series documents has gone on for many months, it happened to me for the first time during the above mentioned survey that I learned about specific cases from the original source. The cases which were discussed indicate that the interpreter who might be on the Government or the contractor side either did not read or did not understand the documents or thought he could apply them without thinking. The documents furnish guidelines which have to be applied case by case, they do not furnish receipes for each and every case; they are designed to stimulate thinking and not to eliminate it. Their application requires engineering judgement and for this reason, I continuously ask for a higher calibre of people in these areas. It would help to improve the situation if other Centers, particularly MSC, as far as the Saturn-Apollo program is concerned would have an organized group of people who systematically work in the quality field. Unfortunately, NASA Headquarters has not accomplished this yet, despite repeated effort I made in this respect for the last two years. Rewriting the documents or issue of supplementary instructions will not help.

agree B

NOTES 9-21-64 GRUENE

Negative report.

Tue 9/21

NOTES 9/21/64 HAEUSSERMANN

B 9/27

No submission this week.

Fw 9/21

NOTES 9/21/64 HEIMBURG B 9/27

1. S-I STAGE: The second propellant loading test was completed on 9/14. Data from the test are being evaluated to determine the lox topping method and helium bubbling rate to fulfill the 2.2% ullage requirement for the launch site.

The short-duration firing scheduled for 9/16 was postponed until 9/22, as a result of a lox leak at the center tank bottom manhole cover. (A similar leak on this manhole cover caused termination of the initial try for the second propellant loading test as reported in 9/14 NOTES.) Inspection of the flange surfaces and gasket did not reveal any discrepancies. Investigation of the bolt torque values indicated uneven loading of the gasket which might have been responsible for this leakage. In an attempt to correct this condition, a new torquing procedure, coordinated with P&VE, will be instituted.

2. F-1 ENGINE: The spare thrust chamber sent to Rocketdyne for modification will be returned by Guppy, 9/22. Engine buildup will start immediately, and testing will begin the second or third week of October.

3. SOUND SUPPRESSION TEST STAND: Two successful 30-second duration tests were made on 9/16 and 9/17. The purpose of these tests was to gather sound data for comparison with previous H-1 engine tests. It is anticipated that four tests will be made during next week, after which the facility will be modified, by adding a flame deflector, to more closely simulate S-IC stand conditions, both at MTF and MSFC.

4. WEST AREA FACILITIES: Problems outlined to Mr. Diaz by Mr. Shepherd are being resolved satisfactorily, except for the frozen sheave bearings in the stiff-leg derricks. The sheave blocks are being disassembled to determine the extent of the damage. No solution for this problem has yet been proposed by the Corps of Engineers. Also, no revised schedule for the activation of these derricks has been presented. It appears that this situation will not be clarified before two weeks.

The principal unsolved problem area is the provision of adequate funds to correct these deficiencies and to complete construction. These funds are needed immediately to prevent a slip in the activation dates of both the S-IC and the F-1 stands. On 9/18, the Corps of Engineers estimated that approximately $650,000.00 will be needed. A proposal is pending to provide these funds by cancelling some of the FY 1965 projects in this area and applying a portion of this money to resolve these deficiencies. This matter is being handled by Mr. Shepherd.

5. EAST AREA FACILITIES: Work has started on installation of instrumentation in the East Area blockhouse and the GSE facility. Work is also underway on the addition to the Test Lab support shop building. The progress on the J-2 Test Stand and the S-V Dynamic Stand is proceeding satisfactorily. The modifications to the Components Test Facility are a few weeks behind schedule, which may adversely affect instrumentation installation.

NOTES 9-21-64 HOELZER

1. FACILITIES: The present construction on the addition to Building 4663 was initially slated to be completed November 15, 1964. Recently, changes in air conditioning ducts, etc., have extended this deadline date by 30 days, the contractor's date now being December 15, 1964. It is the estimation of this Laboratory that the addition probably cannot be occupied until around February 1, 1965. This addition will certainly alleviate some of the congestion of both equipment and personnel within the Computation Laboratory. In addition to this, it is felt that the GE single support contractor may have to furnish some facilities for their own personnel.

2. MAGNETIC TAPE CERTIFIER AND TESTER: The Computation Laboratory has purchased a magnetic tape certifier with tape cleaners for reclamation of magnetic tape. It has been installed for approximately two weeks and is felt that these items will much more than pay for themselves through the reclaiming of unusable tape and placing it back into service. The Slidell Computer Facilities has asked at present that some 200 of their magnetic tapes be tested, cleaned and reclaimed. One of the prime side benefits of this tape tester-certifier is that trouble on a tape unit with any computer can be immediately pinned down as to whether it is the tape unit or the magnetic tape itself. This should make the auditors happy.

3. NASA WORKING PANEL ON VISUAL SIMULATION TECHNOLOGY: Mr. F. T. Shaver, Chief, Simulation Branch, is the Marshall representative on the subject panel. As part of the Panel's research program, a research task investigating "Wide Angle Optic System for Visual Simulation Application" is being managed by the Simulation Branch. A RFP has been issued on this task and fifteen proposals are being evaluated. This task is being coordinated with one managed by MSC on "Virtual Image Display Systems." Copies of the proposals on the MSC task have been received and are being reviewed by the Simulation Branch.

fw 9/21

B 9/27

NOTES 9/21/64 JAMES

SA-7: At tomorrow's Management Council I will present about 10 minutes on results of SA-7.

SA-9: During the Pegasus Review last Thursday, Dr. Rees agreed that the stages for SA-9 should not be shipped to KSC until after the Pegasus Review at the Management Council tomorrow. S-I-9 and S-IV-9 are ready for shipment or storage depending upon decisions reached tomorrow on launch dates.

CHRYSLER LAUNCH OPERATIONS EFFORT: The procurement plan for the Chrysler launch operations effort has been signed by Dr. Debus and will be handcarried to Washington today. This procurement plan is based on the recent KSC/MSFC agreement.

*fw S-I-10: Short duration firing scheduled for Sept. 16 has been rescheduled for Sept. 22 due to a leak around the 105" LOX tank manhole cover gasket.

*fw S-IVB BATTLESHIP: The 1st battleship propellant loading was initiated on Sept. 17 as scheduled. Minor difficulties and corrections to loading procedures delayed the start of actual loading and a hold was established at approximately 2:00 p.m. on the 17th and loading was rescheduled for the 18th. Purging continued in the vehicle tanks and engine area. Minor problems in purging area were detected and corrective action taken.

* LH_2 loading started at 12:30 p.m. on 18th. No leaks or problems were noted at 5% level. The 90% level was attained approximately 2:00 p.m. Leakage was detected at base of LH_2 storage tank in area of the transfer shutoff valve and at top of the LH_2 storage tank in area of the burst disc. A slight leak was also detected at prevalve. The leakage was not serious and operations continued.

The LH_2 pump torque check was satisfactory and overflow sensor closed the fill and drain valve at approximately 44,000 lbs of LH_2.

Unloading was initiated at approximately 3:00 p.m. and completed at 4:30 p.m. A problem was encountered with freezing of cold helium sphere dump valve. This was bypassed by use of a hand valve. Propellant tanks and engine have been purged and preparations are underway for initial engine chilldown test.

DAC tentatively plans to load LOX and LH_2 on Sept. 24 or 25 for start of engine chilldown. The LOX pump will be chilled by use of forward recirculation system. LH_2 is to bleed overboard from two engines bleed valves at the GG and pump discharge.

The loading operation was very smooth, only minor problems encountered; the test crew is to be complimented for a job well done and operations are proceeding according to schedule.

INSTRUMENT UNIT PRIME CONTRACT: Negotiations with IBM will resume this afternoon. The scope of work will be reviewed followed by cost negotiations. The IBM mission effort is currently covered by a cost incurrence provision.

NOTES 9-21-64 Koelle

B 9/27

1. MARKETING OF SPACE FLIGHT: There is growing evidence that we will have difficulties in the years to come to sustain the public support we enjoyed in the last years. This suggests - and I know that you have preached along these lines quite often recently - that we at MSFC should make an organized effort to come up with a better utilization of our space flight capabilities and take great care to justify, in a better way, the use of newly developed hardware and new projects; e.g., the "why" of space flight. Up to now we have concentrated almost exclusively on the "how" of space flight. This no longer seems to be the crucial issue. I would suggest a special brain storming session in which we analyze how our MSFC talents can be brought to bear more on the problem of space flight marketing. I am thinking of increasing our present effort (which is a few hundred man-hours per year) by at least two orders of magnitude. This might require an organizational change or shift of some manpower. I am thinking of a group of 5 to 10 professional people doing nothing but to compile potential applications and develop the uses of space flight in an aggressive manner within NASA policies and in conjunction with other organizations. Many avenues of approach offer themselves in accomplishing such an objective.

HHK
Let's discuss this again between you, Steidner, Frank W. and myself). I expressed my feelings during the 9/25 Executive Session. B

2. S-II ORBITAL FUELING TEST PROGRAM: Last Friday we had a full day planning meeting with Dr. F. Dixon, Director for Manned Planetary Studies under Ed Gray. One of the subjects discussed was an orbital fueling test program in the early 1970's, as a first development phase toward achieving a manned planetary flight capability for reconnaissance (flyby) missions in the mid 1970's. Dr. Dixon was very receptive to such a study proposal and we will draft and coordinate a letter for your consideration from you to Dr. Mueller or Ed Gray, suggesting a feasibility study on this subject during FY 1965. We are thinking of a few hundred thousand dollars advanced study money, plus some in-house support from MSFC and KSC. George von Tiesenhausen attended the discussion and thinks that Dr. Debus would also support such an effort.

I'm greatly in favor of this! B

3. ABE HYATT, MIT JEROME HUNSAKER PROFESSOR 1964 - 65: I quote from a recent letter. "If you or any of my former associates at Huntsville will be visiting Boston or M.I.T., I would be very honored if you would call on me." Address: M.I.T. Cambridge 39, Mass., Room 33 - 113.

Bonnie
Please make note for my next trip into Boston area. B

fw 9/21

B 9/27

NOTES 9-21-64 KUERS

1. S-IC Manufacturing Plan and Facility Utilization at Michoud: The S-IC Manufacturing Plan, developed by Boeing, for Michoud, differs in many respects from our MSFC plans because of differences in facilities and because of higher production rates at Michoud. It was our policy in the beginning of the program to jointly establish basically identical concepts in order to use identical tooling in both places. However, during the last 6 months it became more and more apparent that Boeing had developed different concepts for utilization of their Vertical Assembly Building (VAB), which required different and additional tooling which did not meet our approval. I have been gravely concerned about this divergency of our concepts because of obvious flaws in the Boeing plans. In many meetings with Boeing and Mr. Nuber, we tried to analyse the merits and disadvantages of their plans and our ideas. We were mainly striving at unloading the VAB with sub-assembly operations which could easily be carried out in their low bay areas with the same tooling as we use here. In a meeting last Friday, we succeeded finally to come to an agreement. Mr. Coenen and his tooling and facilities engineers presented a new Boeing plan in which they had adopted our principles. This new plan will be effective for the -F vehicle without any schedule impact. One basic advantage of this plan is that it does not require the activation of a third assembly station in the VAB, thus saving the big turntable and equipment for this station. This space will then be utilized for a sick bed where repairs and modifications can be accomplished without impairing the normal flow of work. We are glad having reached this decision voluntarily by Boeing without being forced to give them a directive.

S-IC-T: At the Lox Container a total of 12 places had to be filled in by weld repair in order to correct for excessive undercuts after grinding of the cracks. Re-hydrostatic testing and re-cleaning of the lox tank will start this week. The fuel container is still in the process of removal of cracks and in preparation for repair by welding.

S-IC-S: Correction of cracks at the lower lox dome was completed and welding of the dome to the cylindrical section has been completed successfully. The upper lox dome is in process of crack correction at Boeing. Indication of approximately 120 cracks were found.

fwg 9/21

B 9/27

NOTES 9-21-64 MAUS

1. GENERAL MANAGEMENT (ADMINISTRATOR'S) PROGRAM REVIEWS - The first of these reviews in the FY 65 series is being held tomorrow on Communications; Meteorology; Advanced Technological Satellites; Geophysics and Astronomy; International Programs. Dr. Lange will represent you at the Tuesday, Sept. 22 review. The re-run of the presentations on Wednesday, Sept. 23 will be attended by five MSFC people as follows:

   Dr. Mechtly, R-RP
   Mr. Goerner, R-P&VE
   Mr. Robert Smith, R-AERO
   Dr. Sieber, R-TEST
   Mr. Brooksbank, R-P&VE ✓

2. BOB VISIT - We prepared a tentative agenda for the visit of the BOB representatives the week of Sept. 28, and reviewed the plans for the visit with Dr. Rees and Mr. Gorman at 9 A.M. today. A summary discussion period is planned to be held at a luncheon meeting on Friday, October 2, 12:00 - 1:30. We hope you will be able to attend. ✓

3. NATIONAL LAUNCH VEHICLE STUDY - No final decision has been reached yet between NASA, DOD, and Bureau of the Budget on the basic approach for the National Launch Vehicle Cost Comparison. Messrs. Hilburn of NASA and Asher of DOD met frequently last week with Mr. Shapley of BOB, who was brought in as an arbitrator at Mr. Webb's request.

   During this study, under considerable pressure from Mr. Hilburn to meet an August 31 deadline, MSFC compiled and submitted voluminous cost estimates to NASA headquarters, which up to this point have been of dubious value since the basic approach is changing. We are continuing to comply with the requests from NASA headquarters for additional detail data.

   Meanwhile, it appears that primary concern is the development of a computer program which NASA headquarters could use for generating estimates for any mix of launch vehicles, and that the objective initially stated to MSFC for this study (the estimation of comparable costs for the various options of the August 5 mission model) is receiving little attention.

H.M. PLEASE keep an eye on this. I'm sure the AF put their smartest people on the task to show their TMC in the best possible light. B

NOTES 9-21-64 McCartney

1. ESE CHECKOUT STATION: Action is underway to renovate Building 4373, which was previously occupied by Quality Laboratory. The building will be used for an ESE checkout station. Renovation will include approximately 7000 square feet on the first floor for equipment checkout, and 2000 square feet on the second floor for office space. This effort will be classified as a Repair and Alterations Project, utilizing R&D funds. It is estimated that the cost of renovation will not exceed $150,000 and will be performed by Technical Services Maintenace personnel.

2. VISIT TO NASA, HEADQUARTERS: Last week, Mr. Bush, Chief of my Programs and Contracts Group, visited NASA Headquarters to discuss status of the FY-65 SRT programs. Headquarters expressed confidence that the programs would be processed more rapidly than during the past year. They estimated that we would receive the bulk of SRT approvals within the next two weeks, and that the Advanced Studies tasks would be approved by November. In about six weeks, we plan to follow up with a similar visit.

3. RELOCATION OF P&VE PERSONNEL FROM THE HIC: P&VE has decided to return the Propulsion Division to the Marshall area, rather than the Structures Division, as originally planned. It was decided to meet the requirement for physical separation of civil service and contractor personnel by locating civil service in Building 4610, and contractor personnel in Building 4481. Building 4481 will be occupied substantially as is, saving about $100,000 in modification costs which would have been required to locate the entire Division in that building.

4. SOURCE EVALUATION BOARD ACTIVITIES: The Board met on September 16 to initiate evaluation of the two proposals received for the TEST Laboratory; the report of findings will be completed early in November. During this week, proposals are to be received for the Facilities and Design Office and for the Quality Laboratory. Board activities are continuing on schedule.

5. BUREAU OF BUDGET VISIT: Representatives of my Facilities Group are working with the Facilities and Design Office in preparation for the September 28 visit by the Bureau of Budget. Presentations to BOB on the CofF programs will be made by user laboratories and will cover projects which you have recommended to NASA, Headquarters, for approval.

Fw 9/21

B 9/27

NOTES 9/21/64 RUDOLPH

1. Systems Engineering and Systems Integration Support Contract - Negotiations began with the Boeing Company for Saturn V Systems Engineering and Systems Integration Support effort September 14, 1964. An agreement is expected on the scope of work and manpower staffing today (September 21, 1964). Negotiations on cost will follow. ✓

2. Vibration Testing of Flight Hardware - A meeting was held on September 15, 1964, with Mr. George Lemke, Director, Apollo Reliability and Quality Office and interested MSFC personnel concerning vibration environment as part of acceptance testing of flight hardware. At the end of the meeting, Mr. Lemke basically agreed with the MSFC policy of selecting only those components for vibration as a part of acceptance testing for which benefits will accrue. ✓

3. S-II Stage:

Control Sensors - It has been determined that there is no requirement for control sensors on the S-II Stage; therefore, a stop order will be issued on any further work on the control rate gyros and control accelerometers. ✓

Design Reviews - On September 14, 1964, S&ID made a presentation to MSFC on Design Review, in lieu of existing control drawing procedures. As a result, MSFC agreed to pursue the design review philsophy for a six (6) month trial period. ✓

4. S-IVB Vendor Survey - This past week Mr. Roy Godfrey participated in a survey of selected DAC/S-IVB Vendors in the Los Angeles area. Purpose was to review Quality Assurance aspects of S-IVB components. Results of the survey will be reported next week. ✓

5. Instrument Unit - Contract NAS8-11562 on Flight Hardware Guidance Computer and Data Adapter with IBM was approved by NASA Headquarters on September 15, 1964. ✓

NOTES-9-21-64-SHEPHERD

No Notes

tw 9/21

B 9/27

NOTES 9-21-64 Stuhlinger

1. RPL SUPPORT CONTRACT: We have learned that the major local contractors will probably not bid on the RPL support contract in view of the rule that a company cannot be prime support contractor for more than one MSFC laboratory. In the interest of obtaining high quality support, we are discussing with R&DO management the possibility of granting a waiver on this rule as far as RPL is concerned. ✓

2. RESEARCH PROGRAM CONSOLIDATION: On September 15, RPL presented to Mr. Weidner and his staff the proposed plans for a MSFC Consolidated Research Program Office. Tentative approval was given, and RPL was instructed to prepare a presentation for the Board meeting this coming Friday. ✓

NOTES 9-21-64 BELEW

F-1 ENGINE

In pursuit of a solution to the F-1 engine injector "popping" problem, 16 of the 32 LOX feed hole splitters have been deleted from the outer LOX ring. (These splitters were located next to the baffles and were bending during testing to the point that they were disturbing fuel flow through some of the injector orifices.) To date about 800 seconds of testing (two injectors in two engines) have been accomplished with no "popping". If subsequent tests are successful, the first S-1C-T engine (F-2004) will be sent to Edwards for acceptance testing the week of September 21 (2004 has been modified to this configuration).

RL10 ENGINE

SA-7 Launch - All indications are that the six RL10 engines on the S-IV-7 stage launched at 10:25 a.m., Friday, operated satisfactorily.

S-IV-9 Contamination - "Oxylube" contamination found in the S-IV helium system in S-IV-9 will necessitate disassembly and cleaning, reassembly and leak test of the RL10 engine helium systems prior to shipment of the stage to the Cape. It is expected that this work can be completed with no delay in schedule.

H-1 ENGINE

Negotiation is underway to convert the H-1 Engine Production Contract (NAS7-162) from Cost Plus Fixed Fee to Cost Plus Incentive Fee. The configuration for the improved performance injector to be subjected to the final development phase of the program has been selected. The type selected exhibits a performance gain of five seconds specific impulse over the production type delivered in the first eight 200K engines.

J-2 ENGINE

Engine chilldown flow rate and pressure drop tests are continuing relative to propulsion system chilldown on the S-IVB and S-II stages with engine J003-2A. Engine starts at vehicle inlet pressures and gimbal tests are scheduled on this engine for this week.

Two major incidents occurred during acceptance of two engines.

Engine J-2007 experienced an external explosion at 107 seconds into mainstage. Damage is limited to tubes at the lower thrust chamber area. A leaking thrust chamber is suspected as causing a collection of hydrogen beneath thrust chamber insulation. The insulation is utilized to permit cooling of thrust chamber.

Engine J-2005's gas generator (G.G.) exploded upon ignition of G.G. spark plugs. (The cause is believed to be attributed to leaking G.G. control valve, allowing accumulation of combustible mixture.) The impact of these incidents will be a matter of discussion at Rocketdyne on Tuesday, September 22. Bob Young and I plan to be in these meetings. P&VE, Test and people from the J-2 Project will be there most of the week.

Fw 9/21

B 9/24

NOTES 9-21-64 CLINE

1. S-IV STAGE NONPROPULSIVE RESIDUAL PROPELLANT VENTING SYSTEM DEFINED: The high flowrate nonpropulsive venting system will be controlled by a single valve (RL-10 fuel shutoff valve) which will be opened for 3 minutes at orbital injection. This will adequately blowdown the H_2 tank to eliminate functioning of the main vent valve due to pressure spikes at APOLLO/S-IV separation.

2. TWO SATURN IB AND SATURN V INSTRUMENT UNIT COLD PLATES PASS DEVELOPMENT TESTING: The plates passed development tests with the 330# battery load and latest vibration environment. A third plate will be tested by 10-1-64.

3. DECISION MADE TO USE THE 5582FB TYPE IMPROVED I_{sp} INJECTOR ON H-1 200K ENGINE: Preliminary data indicate an Isp of 262.8. The gain of 5.3 Isp over the 5545 injector (used on 188K engines) was achieved mainly through the reduction of film coolant from 5.04% to 1.80%. The stability characteristics are better than the 5545 injector and the expected chamber life will meet model specification requirements. It is planned to use this injector on all S-IB flight stages.

4. KIWI B-4E: The disassembly of the test reactor has proceeded through the removal of the pressure shell and some of the peripheral fuel element clusters. Some evidence of erosion was noted, but no structural damage is evident.

5. NRX-A2: The rescheduling of the NRX-A2 until 9-23-64 was caused by interference from the second test on the KIWI B-4E.

6. S-IC WELD CRACKING: The problem has been isolated and is associated with weld close-outs, primarily those made in weld repairs. A new technique development by the Manufacturing Engineering Laboratory has been evaluated and shown to alleviate the cracking problem. Although we do not anticipate complete success in all repair welding, we do not expect to have weld cracking problems of the nature encountered recently. The Boeing Company has been kept abreast of all results and developments for use in their program.

NOTES 9/21/64 CONSTAN

1. Support Services. On September 15-16, 1964, a preproposal conference was held covering the Request for Proposal for support services for Michoud Operations during CY 1965. Approximately 45 persons representing 28 companies were in attendance. Proposals are due October 15, 1964.

2. S-I/IB Activities.

SA-8 - All engines for this vehicle have been returned from Rocketdyne. Engine reinstallation and miscellaneous changes are in process. No schedule problems are anticipated.

SA-10 - In Huntsville for static test.

S-IB-1 - Engine installation, propellant line and engine accessories, such as heat exchangers, turbine exhaust, etc., are in process of assembly.

S-IB-2 - Work in process on tail section, spider beam and tanks.

SA-D-5 - being converted to S-IB configuration. Cleaning of all tanks is complete, and painting is in process.

3. S-IC Activities.

Meridian Weld Station. Unpredictable oscillation or hunting of the head on the welding equipment has been encountered for the past two weeks. Manufacturers' representatives, including Mr. Sciaky himself, have been here working on the problem, but we do not know when a solution can be expected. Since this station is loaded end-to-end for the next several vehicles, we anticipate more slippage in weld station certification and resultant vehicle fabrication.

Weld Cracks. S-IC-S bulkhead inspection and repair area requirements have been identified. Repair procedures are being coordinated with P&VE but no repairs have been started yet.

Mockup Review. An MSFC team headed by Dr. Mrazek and Mr. Bob Young completed the S-IC-T Mockup Review on September 17, 1964. Many discrepancies in documentation and equipment installation were noted. Boeing will have their engineers review the mockup and correct and improve installations to the extent necessary to support their engineering and manufacturing responsibilities.

Notes 9-21-64 DANNENBERG

1. Proposed Procedure for Design Review - After a S&ID presentation to R&DO Working Group and Lab Directors, a six month trial of the S&ID proposed new Design Review procedure was agreed to. If successful, the procedure will replace the current Control Drawing System.

2. S-IC-T Mockup Review - was effected at Michoud on 9-15/16-64 with the following results:

   a. Usefulness of the Mockup to MSFC is obscure.
   b. S-IC-T design configuration represented by mockup could not be determined.
   c. Contractor expected MSFC review team to isolate, identify, and document errors in design and fabrication and initiate on-the-spot corrective action.

The contractor was told that he could use mockup for his own internal use and that MSFC will make suggestions, but not direction.

3. S-IVB Auxiliary Power System Servicing Units - covered by Contract NAS 8-11750 was approved by Headquarters with the provision that NPC 500-1 be incorporated immediately.

4. ESE Design and Fabrication - Amendment 4 to Task Order 15 of Contract NASw-410 has been prepared. This amendment will incorporate the fabrication and checkout requirements into the ESE Design Mission. Since our present contract coverage will phase out on 9-30-64, it is of extreme importance that immediate action be taken to expedite contractual actions, after Headquarters approval is obtained, to assure that coverage is effected on 10-1-64.

5. Extension of ME Laboratory Task - Approval has been obtained from Headquarters to extend the present scope of work for ME Lab under Contract NASw-410 for period 10-1-64 through 4-30-65.

6. Boeing Saturn V Systems Engineering and Integration - Negotiations on the Boeing proposal are proceeding on schedule. Substantial reductions in manpower have been achieved to date.

Tw 9/21

NOTES 9/21/64 FORTUNE B 9/24

1. Mr. Webb's Visit: After Ray Kline called Saturday, I was prepared to meet Mr. Webb at Michoud, but plans changed. Mr. Webb joined the NASA-New Orleans Coordinating Committee visit to MTF September 14. I was in Washington speaking to the Society of Automotive Engineers. Following a slide presentation and tour of the facility, Mr. Webb met with local Mississippi officials. John Hilburn accompanied Mr. Webb on the tour and, along with Mack Herring and B. U. Jones, participated in the meeting. Subjects discussed were primarily those relating to the space program and how the Mississippi Test Facility fits into the overall picture with emphasis on the economic impact this facility will have on the area. Mr. Webb did a masterful job enhancing community relations and I was pleased to hear MTO efforts in regional assistance received warm praise from Mayor Scafidi of Bay St. Louis. A copy of Memo for Record is attached. (Dr. von Braun's copy only). ✓

2. Call From Mr. Drotning: Mr. Webb's Special Assistant inquired last Thursday if there would be anything significant for Mrs. Lyndon Johnson to see or dedicate if she stopped by MTF in the near future. I could think of nothing dedicatory but said I would have other MSFC personnel think about a visit and let him know early this week. I have talked to Bob Young about it and will take it up with Slattery, Heimburg and Shepherd, then ask Frank Williams to convey your thoughts on to Drotning. Senator Stennis mentioned that Mrs. Johnson would be in Biloxi Oct. 8 enroute by train to New Orleans. Drotning inquired if Governor Johnson might come down. The latter has publicly announced that he would personally greet Mrs. Johnson or any member of the family if they visit the state during the campaign. ✓

NOTES 9/21/64 GEISSLER

1. Thrust Augmented Saturn IB: A performance study has been completed for a Saturn IB with 4 Minutemen solid propellant motors strapped on to the S-IB Stage. The Minuteman motor burns for 63 seconds and has an average thrust of 178,000 lbs. at sea level. The solid propellant weight is 45,800 lbs. Two Minuteman motors, ignited at liftoff and jettisoned at strap on motor cutoff, increase payload into a 105 nm circular orbit (launch azimuth 72°) by 5400 lbs., including no beefup, and by 5100 lbs. when the structural increases are accounted for. Four solid motors, ignited at liftoff and jettisoned at strap on motor cutoff, increase payload by 10,600 lbs., including no beefup, and by 9200 lbs. when structural increases are accounted for. The maximum aerodynamic pressure increase over the present Saturn IB value of 3100 kg/m^2 is 300 kg/m^2 and 1200 kg/m^2 for two and four motors respectively. The study is being continued to find a method of reducing q max., while retaining as much payload as possible.

2. S-II Lox Tanks Slosh Baffle: For the past two months, NAA S&ID has been testing a new baffle for the LOX tanks of the S-II stage to meet the MSFC requirements for damping (3-5%), during the powered flight of the S-IC stage. Preliminary test results indicate that for optimum damping (approximately 6%) the baffle has to be placed approximately 7" under the liquid level surface. Recently Aero-Astrodynamics Laboratory completed a performance analysis which indicated that if the propellant load is increased to 964K pounds for the S-II stage-equivalent LOX 815K and LH_2 149K pounds - that the payload gain is approximately 670 pounds. P&VE indicates no serious problems in this increase in propellant loading. NAA has also agreed that this loading can be achieved. R-AERO has verbally given I.O. the necessary technical input for them to provide technical direction to the contractor to proceed with the manufacture of the newly designed baffle. Formal documentation to I.O. will follow. The baffle is to be located for optimum damping, at an equivalent level of 815K pounds of LOX.

3. Environmental and Physical Standards for Apollo Spacecraft: Messrs. W. Vaughan and R. Smith attended a meeting at MSC on September 15-16, 1964, in conjunction with personnel from Grumman Aviation, North American Aviation, and Bellcom. The purpose of the meeting was to discuss "Natural Environment and Physical Standards for Project Apollo Spacecraft," a document proposed by MSC for use by their contractors. There is good agreement between MSC's document and MSFC's launch vehicle environment documents on the numerical values. In the astrodynamic constants area, all participants agreed to use the values recommended by JPL, and adopted by the NASA Ad Hoc Committee. The formation of this NASA Ad Hoc Committee resulted from Aero-Astrodynamics Laboratory's calling a meeting to standardize on a set of astrodynamic constants between the various organizations involved (JPL, GSFC, NASA Hq, LeRC, MSC, and LRC) in the Agena-Centaur and other programs.

September 28, 1964

Mr. Kent
Fortune items?
Talk to Fortune
DAH

NOTES 9/28/64
WITH COMMENTS

Mr. Newby's Copy

NOTES 9-28-64 BELEW

B 10/1

RL10 ENGINE

RL10 engines selected from production experienced minor difficulties in the Qualification Test Program. Salt air and vibration tests caused small hydrogen leaks at the fuel inlet manifold. Moisture under chamber jacket caused tube separation in the chamber. Although the latter problem is a ground test occurrence only and neither problem could cause an in-flight malfunction, corrective changes are being made to the engine.

J-2 ENGINE

Twenty-seven engine system tests have been conducted on the first FRT type R&D engine J003-2 over a period of three weeks, for an accumulated duration of 1671 seconds. This engine was successfully gimbaled again this week along with evaluation of the GSE thrust chamber diffuser, heat exchanger, and propellant utilization performance.

Recent problems with the hydrogen pump turbine and gas generator, and their impact on the development and production programs, were the major points of discussion and recommended action in the J-2 Program Review meeting held at Rocketdyne last week.

First LOX and Hydrogen J-2/S-IVB chilldown test at Sacramento indicates the battleship vehicle is much easier to chill than the engine stand at Rocketdyne. The hydrogen system chilled in less than two minutes.

F-1 ENGINE

The 084E type injector, reported last week, continues to demonstrate acceptable performance and stability in engine system testing. Five engine systems now have this injector. Testing will continue in order to give the maximum number of tests prior to Flight Rating Test (FRT).

Two engine systems, 011-2 and 020, have been retired for rebuild. It is of interest to note that both engines had more than 2200 seconds of testing and 33 starts without major repair.

The first firing to checkout test stand 1C at Edwards was conducted successfully with no discrepancies noted, on September 18, using R&D engine 021.

It is noteworthy to mention the Dr. D. Klute, Senior Engineer in charge of the Combustion Stability effort at Rocketdyne, died of a heart attack while at work on September 23, 1964. This will undoubtedly represent a very great loss to the program in this highly complex field.

H-1 ENGINE

The first short duration test of Stage SA-10 was prematurely terminated at approximately ignition plus three seconds by Thrust OK Pressure Switch on Engine Position 1. Thrust on this engine was not up to the specified value at three seconds due to a Gas Generator LOX Injector Purge Check Valve malfunction. The check valve was removed and galled areas were found on the poppet and guide. It was determined that if the two galled areas overlapped, the valve would remain open. The check valve was replaced and the stage was successfully static tested on September 24, 1964, for approximately 32 seconds.

Negotiation of the Production Contract from CPFF to an incentive CPIF, has temporarily been suspended to allow Rocketdyne to re-evaluate their present cost projections.

NOTES 9-28-64 CLINE

B 10/1

1. NRX-A2: The scheduled test (9-23-64) was postponed due to a leaky LH_2 facility valve, and a sudden reversal of wind direction which necessitated evacuation of the Control Point. A successful test (7 minutes) took place on 9-24-64 at 85% of design power. LH_2 Dewar problems shortened the planned duration by approximately 30 seconds. A restart run is planned for 10-1-64.

NOTES 9/28/64 CONSTAN

B w/1

1. SI/IB ACTIVITIES

SA-8 - All engines have been reinstalled after LOX dome replacement by Rocketdyne. Additional accessory installation continues on schedule.

SA-10 - In Huntsville for static test.

S-IB-1 - Engines installed and other assembly work continues on schedule.

S-IB-2 - The tail section and 105" LOX tank have been moved to the assembly area, and clustering is in initial stages.

SA-D-5 - Conversion to S-IB configuration remains on schedule.

2. S-IC ACTIVITIES

Meridian Weld Station - The meridian weld station, mentioned in last week's report, is still not certified because of equipment problems.

Vertical Assembly Building - A third level steel cantilever work platform in the Final Assembly Position of the VAB separated from its supporting hinges and fell approximately 100 feet to the concrete floor. Total damage report is not available, however, the platform was damaged beyond repair. There were no injuries sustained in this accident.

B 10/1

NOTES 9-28-64 DANNENBERG

1. Launch Operations Panel Meeting - This panel has been criticized by the PRB for doing its work in a large number of sub-panels without the main panel getting together for over 12 months. In this meeting, three sub-panels were abolished and the representation of all 3 Centers on the rest was increased. The decision by Dr. Mueller to handle all GSE in the Launch Operations Panel was discussed and held in abeyance since KSC and MSFC are planning to appeal this decision in the PRB meeting of 10-19-64.

2. Manpower Survey - R-SA received assignment to assist in Manpower and Tasks Review Survey being initiated by Dr. Rudolph. S-II survey details will be available 9-30-64. S-IC survey was deferred per IO instructions.

3. ESE Design, Fabrication, and Checkout Mission - NASA Headquarters approved on 9-22-64 our proposal to include the ESE Fabrication and Checkout into the ESE Design package with the understanding that negotiations for the definitization of the ESE Design will proceed and that the Fabrication package will be negotiated separately, with an effectivity date of 10-1-64.

4. Boeing Saturn V Systems Engineering and Integration Proposal - Negotiations on the Boeing proposal were finished on 9-25-64. The total negotiated cost for direct labor and overhead was $78 million. Fee will be negotiated at Michoud Operations. Negotiations for the Dynamic Test Vehicle Operation and the Ground Support Equipment tasks will be conducted at a later date.

NOTES 9-28-64 FORTUNE

B W71

1. I-59 Dedication - at Poplarville was attended by B. U. Jones last week. Officials gave credit to NASA for improving state commerce. This Interstate Highway is progressing well through Mississippi and will accelerate vehicular traffic from Michoud-Mississippi Test to Huntsville. However, reports indicate it is not as far along in Alabama and perhaps a committee might look into the overall road network serving MSFC activities. Will discuss this with Gorman's office. ✓

2. Regional Planning Needs Boost - At last week's meeting, representatives from Hancock and Harrison Counties indicated difficulty in getting sustaining appropriations from their supervisors. Pearl River County and St. Tammany Parish are supporting it. We will have to exert special effort to encourage regional planning and cooperation among our neighbors to assure orderly development and not a heterogenous melange of trailer courts, beer joints and assorted housing.

Dave Newby B

3. Executive Leadership Institute - at Warrenton, Va., will occupy my week. It required a heavy amount of advance reading on various governmental operations, including the newly-established office of Economic Opportunity. This may be of help to us in Mississippi. I want also to bring the grade structure to Gorman's attention, there being 16 GS-17s and GS-18s in addition to 6 Statutory positions. ✓

NOTES 9/28/64 GEISSLER B 1071

1. SA-7 Flight Evaluation: The SA-7 vehicle performance was excellent. No malfunctions have been detected yet. First results have been reported to Dr. Mueller; (TWX 9/21/64). The first inhouse Bulletin was issued 9/23; and a brief flight summary was given by Dr. Speer in the Board and Staff Meeting on 9/25.

2. S-II Stage Propellant Loading and Upper LOX Tank Slosh Baffle Status: As stated in Notes 9/21/64 Geissler (copy attached) we have evaluated the effect of increasing the usable LOX loading of the S-II stage, from the present 781 K pounds to the maximum allowable LOX loading of 815K pounds. It was determined that a payload gain of approximately 670 pounds could be realized by using the new loading. However, in the S-II Dynamics and Control Working Group Meeting, which was held on September 22, 1964, NAA stated that S-II-1 through S-II-3 are not structurally capable of carrying the 815K LOX loading. In addition, results from NAA tests of the new upper LOX slosh baffle, indicate that approximately 6% damping may be obtained by placing the baffle in an optimum position below the liquid level (approximately 7 inches below the surface). Since the first three flight stages will be loaded to approximately 781K pounds of LOX, due to structural limitations, and the remainder loaded to 815K pounds of LOX, it was decided that the LOX slosh baffle be located so that it would provide from 3 to 5 percent damping for both liquid level loadings. The results of the NAA tests presented at VD&CWG meeting indicated that this is feasible using only one baffle. I.O. has also been requested to direct S&ID to insure that S-II-4 and subsequent vehicles are structurally capable of utilizing the LOX loading of 815K.

B 10/1

NOTES 9-28-64 GRAU

1. S-IC WELDMENT CRACKS: Inspection and analysis of S-IC weldment cracks continue to require a substantial expenditure of effort from this Laboratory. Preliminary analysis of data being collected daily, supports the supposition that the cracks are related to weld repair areas, close-outs or tie-ins. The cracks are relatively shallow as evidenced by the fact that 60% have been removed by shaving weld beads to flush condition. Welding, repairing and inspection data requirements have been increased on S-IC-1 and periodic reviews of the welds and data are planned to assist in final analysis and resolution of this problem.

2. S-IV PROGRAM: The Simulated Flight Checkout conducted September 15, 1964, on the S-IV-9 stage was considered satisfactory; however, the data indicated necessary changes to some components and further investigation of others. It has been suggested that DAC use the time realized from the delay in the SA-9 schedule to perform modifications on S-IV-9 that were to be performed at KSC. If this work is accomplished at SACTO, we will propose a re-run of the Simulated Flight Test prior to shipment. This should insure, for the first time, that KSC receives a complete S-IV stage. The S-IV-8 stage is being prepared for cryogenic weighing which is scheduled for September 30 through October 10, 1964. Various modifications, buildup and portions of pre-static checkout procedures are also being conducted at present. Pre-acceptance firing is scheduled for October 28, 1964, but this date is considered optimistic.

3. IBM INSTRUMENT UNIT CHECKOUT FACILITY: Construction of IBM facility is progressing on schedule. It appears that the Systems Checkout area will be available for occupancy by October 4, 1964. The TM ground station for Saturn IB Checkout Complex will be delivered to IBM between October 15 and 31, 1964. It is expected that the first of the Quality and Reliability Assurance Laboratory personnel will be assigned at the IBM plant when the equipment arrives.

4. MANNED SPACE PROGRAM CALIBRATION POLICIES: This Laboratory recently recommended the establishment of some common calibration policies and procedures for the Manned Space Program. In this regard, NASA Headquarters assigned GE a task investigating how the various military services and NASA Centers organize calibration. A representative from GE was here Thursday and Friday of last week to discuss how calibration is handled at MSFC.

B 101

NOTES 9-28-64 GRUENE

SA-7 Post Flight Report: The damage to pad and ground equipment after SA-7 launch was very light. It seems to be possible to always refurbish the pad for the erection of the next booster stage within seven days. The time available for our GSE and pad equipment before arrival of SA-9 is utilized for extensive preventive maintenance operations which include cleaning of pipes. Some contamination was found in regulators, etc. after SA-7 launch. The desirable redundancy of environmental control system equipment (scrub of SA-6) will be provided now and should be ready before launch of SA-9. ✓

NOTES 9/28/64 HEIMBURG B 60/1

1. S-I STAGE: 2

Test SA-22 was performed on 9/22, for a duration of 3.01 seconds. Cut-off was automatically initiated at "time for commit", because the "all engines running" relay was not energized. This, in turn, was due to the lack of the thrust OK signal from engine position No. 1.

Investigation of the test records indicated reverse flow leakage through the gas generator lox injector purge check valve. Inspection of the check valve revealed a small internal burr which probably caused the malfunction. The check valve has been replaced.

Test SA-23 was performed on 9/23, for a duration of 35.08 seconds. No major problems were encountered, and preliminary inspection of test records show satisfactory results.

3. SATURN V GSE FACILITY:

We may be in for some trouble with the American Machine and Foundry Company (AMF). As you may recall (NOTES 3/23/64 and NOTES 4/13/64 HEIMBURG, copies attached), we signed a "ceiling price" contract with them for the Random Motion Vehicle Simulators for the GSE Facility in April of this year. We converted from a CPFF contract to the "ceiling" contract, because we were worried about their management of the program. We were right to be concerned. In a review of the program last week, it came to light that the schedule delivery of the equipment had slipped two months (we can live with this), and their cost to complete would run $600,000.00 to $1,000,000.00 over the ceiling. Their lawyers were here last Thursday to explore with Ed Guilian the possibility of a legal way of getting around the ceiling on the contract. They even hinted stopping work and going to court if a further look substantiates the high over-run. Ed Guilian is following this. We will advise you of further developments.

Please do B

ATTACHMENTS:
1. NOTES 3/23/64 HEIMBURG (to Dr. von Braun's & Mr. Weidner's copies only)
2. NOTES 4/13/64 HEIMBURG (to Dr. von Braun's & Mr. Weidner's copies only)

NOTES 9-28-64 HOELZER

B 10/1

1. PARTICIPATION IN PROJECT MAC: The Massachusetts Institute of Technology has, for some years, been doing studies on Project MAC (Multi-Access Computing) under the sponsorship of the Air Force and the Navy Department. They have agreed to let MSFC participate in this project since it is of special importance to our future computing plans. MIT is considered the leader in this field today. Therefore, Dr. Krenn, Chief, Digital Projects Branch, has been appointed to spend the majority of his time during the next several months at MIT participating in Project MAC. During the period of his association with MIT, Mr. Audie Anderson of the R&D Applications Division staff has been appointed Acting Chief, Digital Projects Branch. Dr. Krenn will return to MSFC at regular intervals to participate in any long range plans pertaining to his Branch.

2. REDUCTION OF SA-7 DATA: Activity in the Data Reduction Branch for the past week has been confined exclusively to the post flight reduction of SA-7 launch and the reduction of data acquired from the first static test of SA-10. The real time coverage of SA-7 launch went extremely well and good data were recorded on the first satellite pass from Computation Laboratory as well as from Green Mountain. Post flight reduction has progressed very well; at this point we are several days ahead of the pace established for SA-5 and SA-6 launches. To accomplish this has required full time use of the two IBM 7094's; computer work for other purposes has been accomplished at the Army Laboratory and at Slidell. Scheduling of the SA-10 static at close to the same time as SA-7 launch points up a potential problem; if these events ever occur on the same day, as they almost did on SA-5, SA-6, and SA-7, it will be difficult for Computation Laboratory to support both events.

3. NEW ANALOG COMPUTERS: Two 231-RV computers which were ordered in FY 64 are in the final stage of checkout at Electronic Associates, Inc., Long Branch, New Jersey. Four Branch personnel have participated in preliminary acceptance tests at Long Branch during the past week. Initial installation and tests will have to be performed in Room C-126 because of the slippage in the construction of the wing extensions. This will require temporary relocation of General Electric personnel occupying C-126.

4. PERSONNEL: General Electric's capability to support the Simulation Branch will be materially increased by the addition of Dr. Harold Moore to the Staff Consultants. Dr. Moore, a mathematical physicist, has many years of experience in analog computation and will provide consulting services in mathematical modeling, analog and hybrid techniques, and optimization theory.

NOTES 9/28/64 JAMES

B 10/1

SA-7: Data from Ascension Island 1710 seconds after launch indicated spacecraft motion was .7° sec. in roll and 1.7° sec. tumble. This spacecraft motion will be confirmed or changed upon receipt and reduction of data from tracking stations in Australia and Victoria, Africa.

S-I-10 SHORT DURATION FIRING: Short duration firing was attempted on Sept. 22 and was cut off at T+3 sec. due to a faulty check valve in the gas generator LOX injector purge line on Engine #1. Valve was replaced and successful 35 sec. firing was conducted on September 24.

PEGASUS: I talked to Bill Johnson this morning concerning the Currie team visit to Fairchild Stratos. Johnson is at F/S now insuring that planning for the meetings is accomplished. Currie's group will arrive this afternoon; office space has been provided and Ed Uhl and his group will be available for the opening meetings. I believe this group can find out all information they desire during next two weeks and it is now set up so minimum interference to F/S work on contract will exist. It is planned that Roy Currie and Bill Johnson will make a presentation to Dr. Haeussermann and myself on Oct. 16 and we will agree then to the changes, scheduling, etc., to be implemented.

SATURN IB GSE: The Saturn IB Launch Complex Systems Identification and Requirements Review has been rescheduled for Oct. 12-13 at KSC.

S-IVB BATTLESHIP TEST STATUS: Two successful engine chilldown tests were accomplished 9/25/64 using LOX and LH_2. Forward recirculation was used for LOX. Pump discharge bleed and gas generator bleed were used for LH_2. Preliminary data is tabulated below:

	Test 1	Test 2
LOX Tank Pressure	38.5 psia	Vented
LH_2 Tank Pressure	37.0 psia	22 psia
Chilldown Time	12 min.	5 min.
LH_2 Pump Inlet Pressure	38 psia	24 psia
LH_2 Pump Inlet Temperature	38°R	38°R
LH_2 GG Bleed Temperature	39.5°R	38°R
LOX Pump Inlet Pressure	51 psia	Bad Transducer
LOX Pump Inlet Temperature	167°R	165°R
LOX GG Bleed Temperature	174°R	171°R

These values indicate that the engine conditions are well within the engine "start box". Two other types of tests were attempted but not successful: (1) Thrust Chamber Chilldown: scrubbed due to insufficient flow of cold helium to the thrust chamber (facility malfunction suspected). (2) Engine Start and Control Sphere Fill Test: scrubbed due to insufficient flow of cold hydrogen gas to engine start bottle (facility malfunction suspected). DAC plans to conduct the next chilldown tests using both LOX and LH_2 forward recirculation pumps with no bleed on Friday, October 2, 1964.

NOTES 9-28-64 Koelle

B 671

No NOTES this week.

NOTES 9-28-64 KUERS

B 10/1

1. Change of Documentation System for S-IC: The Boeing Company has been required by MSFC to change the Engineering Release System. The new release comes now to us in a mechanized computer print-out system. The manual operation for all receiving elements who have to read the documents does not match the mechanized flood of paper. Parts identification at sub-vendors and stock rooms has become a problem; there is also a danger that uncontrolled changes will slip in with the excessive updating of all parts lists. The new system has been introduced and cannot be changed again now, but the wisdom of introducing such a system, in the design effort being more than 50% complete, is questionable. It will have a retarding effect on all manufacturing operations.

Attn Rudolph 10. For info & comment B

2. Delivery of Unqualified Hardware for S-IC-T: In a number of cases hardware had to be returned to vendors for modification because the failures in qualification tests required redesign of the components. This situation becomes alarming because of delays in qualification testing as reflected in the Boeing Document No. D5-12825-3, "Qualification Status Report -T Effectivity". A copy of page 4 of this report is attached for your information.

3. Support of ME Laboratory to MSC and Lewis Research Center: As you know we have for some time, given some limited support to these Centers by review of their tooling programs and manufacturing plans and participation in a number of manufacturing meetings at NAA, Grumman, and Aerojet. Both MSC and Lewis Research Center have repeatedly indicated that such consulting services had been a valuable support to them. Mr. Maurer has informed me that now both Centers plan to establish their own capability in this area, by hiring a number of manufacturing engineering personnel and to organize this consultant service in a similar fashion as our manufacturing management support is set up.

4. Weld Problems on S-IC Hardware: The Lox Container for -T has been completely repaired, passed the second hydrostatic test and is presently in final chemical cleaning. The Fuel Container for -T is still in the process of being repaired. We were asked for assistance in solving of welding problems on the meridian bulkhead welding at Michoud. We have responded by sending some of our best people to help Boeing in this matter.

Encl.
S-IC-T Qualification Status

S-IC-T QUALIFICATION STATUS
QUALIFICATION TESTS
360
300
240
180
120
60
0
3 JAN
9 FEB
6 MAR
19 APR
MAY
12 JUN
5 JUL
AUG
SEP
2 OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
JUL
SEP
OCT
NOV
DEC
LEGEND
Scheduled Qualification
Actual Qualification
D. Rudolph, I.O.
What are we doing about this?
B
B

NOTES 9-28-64 MAUS B10/1

1. NINTH NASA MANAGEMENT CONFERENCE - Mr. Webb has appointed one of his special assistants, Col. Floyd Sweet, to serve as his project officer for the Ninth NASA Management Conference to be held in Huntsville, November 19-20, 1964. Col. Sweet is coming to Huntsville on Tuesday, September 29 to discuss plans for the conference with Ray Kline, MSFC project officer for the conference.

2. BOB VISIT - Members of the group from BOB and NASA headquarters who are here this week for the annual Bureau of the Budget field trip are:

   Mr. Don Crabill, Bureau of the Budget
   Mr. Franz Kretzmann, " "
   Mr. Al Crobaugh, Office of Programs, NASA Hdqs.
   Mr. Ted Hechler, " "
   Mr. Bernard Johnson, MSF, NASA Hdqs.
   Mr. John Sperry, MSF, NASA Hdqs.

3. PROGRAM OBLIGATION PLAN (POP) 64-4 - An internal budget call was issued September 25, 1964, over the signature of Mr. Gorman. This call is for use in preparation of POP 64-4, which is due in Washington November 1, 1964.

4. APOLLO DOCUMENTATION MANAGEMENT - The Center Apollo Document Index (CADI) computer program has been completed and initial printout is expected today. The Document Survey Data Sheets have been transferred to the Industrial Operations Data Manager for conversion to Document Requirement Descriptions. Final draft of the MSFC Documentation Administration Manual has been completed and is now being staffed with the Data Managers prior to publication.

   The Technical Documentation Repository Survey has been completed. The repository is the central receiving, storage and distribution point for all technical documentation requirements of the Center. The objectives of this survey were to assure that it has necessary emphasis and capability to properly support the MSFC Data Management Program.

5. NATIONAL LAUNCH VEHICLE STUDY - The discussions between Mr. Hilburn of NASA, Mr. Asher of DOD, and Mr. Shapley of BOB as arbitrator, have apparently been concluded with an endorsement by BOB of the approach advocated by NASA. The joint NASA/DOD Panel (for cost comparison) is working toward a new deadline of October 28, for making their report to the Aeronautics-Astronautics Coordinating Board.

NOTES 9-28-64 McCartney B w/1

1. R&D OPERATIONS' ESTIMATED FY-65 PROCUREMENT ACTIONS: Recently, a survey was completed with the laboratories to determine the estimated number of procurement actions that R&D Operations expects to submit during FY-65. The survey disclosed that about 52,000 actions are anticipated. As of last Friday, approximately 10,200 actions had been submitted to Purchasing.

2. DOCUMENTATION WORKLOAD: To assist Management Services in reducing their heavy reproduction and distribution workload, an internal R&D Operations study is being made to determine where distribution lists can be cut and printing volume reduced. This action was requested by R-DIR following the Management Services Manpower Audit at which the cubic yardage of paper required for certain periodic publications was graphically illustrated.

3. R&D OPERATIONS' CHARTER: A revised draft of the R&D Operations' charter has been prepared by R&D Operations. The charter is now being coordinated internally with R&D Operations' elements, and should be available to the Executive Staff, for required action, early in October.

4. SOURCE EVALUATION BOARD ACTIVITIES: Last week, the Board began evaluation of the proposals for the Facilities and Design Office and the Quality Laboratory. This week, proposals are to be received for the Technical Services and Management Services Offices. Evaluation of the Technical Services proposals is to begin this Friday. All Board activities are proceeding on schedule.

NOTES 9/28/64 RUDOLPH B401

1. Systems Engineering and Systems Integration Support - Negotiations with the Boeing Company have proceeded to the point where an agreement has been reached on the Scope of Work, direct manpower levels, pricing, etc. It is presently expected that an agreement on fee can be reached this week.

2. Saturn V Test and Checkout Requirements Document - Boeing is supporting the Saturn V Test Office in the preparation of this document. The document will interpret and supplement the Apollo Test Requirements (ATR) for the Saturn V program and provide specific direction for testing. Boeing has submitted the first rough draft for comments. The target date for initial release of the document is November 1, 1964.

3. S&ID Manpower Survey - The activities and manpower survey at Downey will be run by the S-II Manager, Mr. Neubert. The time schedule for accomplishment has been re-established along the lines pursued by MSC, Houston. This allows time for in-house MSFC analysis and agreement prior to the MSFC team going to Downey. The revised schedule is as follows:

By October 5	S&ID to deliver Task descriptions and manpower estimates to MSFC.
October 5-23	MSFC Survey Team review Contractor estimates and justify in-house appraisal to the S-II Manager at Huntsville.
October 26 - November 6	MSFC Survey Team at S&ID for detail discussion and agreement on task and manpower.

4. S-II Battleship Engine - Rocketdyne checked S&ID's 1st Battleship engine for possible turbo pump cracks. Checks showed the pump in good condition.

B 10/1

NOTES-9-28-64-SHEPHERD

CONSTRUCTION STATUS: The following list is of interest in that it shows the CofF projects which have been completed during the past year at Huntsville:

Project	Authorized (In Thousands)	User	Fiscal Year Funds
Load Test Annex	4,574	P&VE	1962
Engineering & Admin. Bldg.	2,246	Admin.	1963
Test Lab. Engr. Bldg.	955	Test	1963
Hi Pressure Indust. Water Sys.	1,506	Test	1963
Instrument Lab.	1,935	Test	1963
Low Temperature Test Fac.	535	P&VE	1963
Components & Sub-Assembly Acceptance Bldg.	900	Quality	1963
S-IC Statuc Test Facility (Beneficial Occupancy)	30,181	Test	1961, 1962, 1963
F-I Engine Test Stand (Beneficial Occupancy)	7,809	Test	1962, 1963
TOTAL	50,641		

B w/1

NOTES 9-28-64 Stuhlinger

1. PEGASUS REVIEW TEAM: The Team, under Mr. H. A. Wilson, LaRc, met for two days last week. The agenda included presentations by the electronics and the mechanics subcommittees, by members of LaRc, Ling-Temco-Vought, and by the Pegasus Project Office. The Team will now write its final report; completion date is mid-October.

2. COST OF PEGASUS PROJECT: In view of recent quotations of the planned versus the actual cost of Project Pegasus, I would like to re-state the planning figures for the Project:

	$Million
a. Estimate by FSC for a contract which clearly did not cover the entire project	6.7
b. Estimates given to Mr. Webb in Contractor Selection Conference, February 1963 by:	
A. Thompson, Head of Contractor Selection Panel:	12.4
E. Rees	12. to 13.
E. Stuhlinger	Not below 12.

Major reasons for overruns include the following:

a. Extension of scope and length of contract by addition of SA-10.

b. Unexpected difficulties with radiation problem.

c. Requirement to develop sensors, which had been offered to us as off-the-shelf components.

d. Difficulties encountered by FSC in moving electronics crew from Long Island to Bladensburg.

e. Elevation of experiment from secondary to primary objective of flight, and subsequent increase of required assurance factors.

3. MOON EXPERIMENT WITH LASER: C. Swanson, J. Randall, J. Reinbolt, D. Hale, R. Schwinghamer, and R. Shelton discussed the laser experiments proposed by Dr. Kopal. It is obvious that two decisive steps must be taken before we can proceed with this experiment:

a. It must be demonstrated that our laser provides the necessary accuracies of focussing and of timing.

b. It must be shown that the objective of our experiment is superior to the objectives of many laser moon experiments which have been considered but discarded by other laser groups.